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The Edge GET READY FOR THE EDGE Our newest print and online resource, launching next week, will focus on the impressive advances taking place at the edge of public carrier nets. Preview, page 50.

The leader in network knowledge

# NetworkWorld

May 29, 2000 Volume 17, Number 22

The network portal: www.nwfusion.com

NOVELL reshuffles

In the wake of disappointing financials, the company reorganizes to focus on the 'Net

PAGE 8.

## Should you Hack back?

There are new tools on the market that let you fight back against a hack attack. But what are the ethical and legal implications of launching a cyber-counterattack?

Page 52

## A case of Cyberstalking

A Kentucky newspaper has been unable to stop a fired employee from cyberstalking a female company executive. If this happened at your company, would you be able to bring the perp to justice?

Page 56

# Microsoft to air grand 'Net plan

*Skeptics wonder if shift to software services will fly.*

BY JOHN FONTANA

*REDMOND, WASH.* — In an undertaking Microsoft likens to NASA's first lunar landing, the company next month will unveil a "risky venture" to transform itself into a provider of software services delivered over the Internet.

The company will highlight a plan to further integrate its server software and development tools to create a platform that will enable Microsoft applications to be delivered as services over the Internet instead of in shrink-wrapped boxes. The company plans to forge ahead with this plan despite being under the glare of the Department of

See **Microsoft**, page 82

In other Microsoft news...

Despite an earful from Judge Jackson, the DOJ sticks to its two-way Microsoft break-up plan.

Page 84.

GEORGE RIEMANN

# Chambers shrugs off bear market

*Cisco CEO John Chambers last week shared his thoughts on the state of his company and the industry during a conversation with* Network World *Senior Editor Jim Duffy.*

**Does the current volatility in the Nasdaq indicate that techs are overvalued or that there are misgivings about the Internet economy?**

I don't pretend to be an expert in the stock market. What I am usually pretty good at is understanding the segment of the industry we deal with and what we see occurring on a global basis. If you really believe, as I do, that this is the second industrial revolution, high tech and the Internet have a long way to run. At times, the market may get ahead of itself; at times, behind. So I don't worry about the short-term fluctuations up or down.

**How is it on the day you announce a $6 billion acquisition of ArrowPoint your stock goes up four points, yet when you announce another solid quarter it doesn't move?**

Our track record on acquisitions is pretty well known. It's a strategy that's served us very

See **Chambers**, page 14

One-on-one with Cisco CEO John Chambers

ED CALDWELL

# Java a la carte

*Java components speeding Web development.*

BY JOHN COX

A market for third-party Java software components finally seems ready to ripen, promising Web commerce developers a rich harvest of reusable code.

The market is materializing as several influences converge:

- Java has reached a milestone in maturity with the release of Java 2 Enterprise Edition (J2EE).
- Corporate developers are under growing pressure to deploy Java-based Web commerce systems quickly.
- Online component marketplaces have sprung up, maintaining a burgeoning inventory of components, such as Enterprise JavaBeans and Java applets. These marketplaces let corporate developers buy and download compo-

See **Java**, page 82

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210

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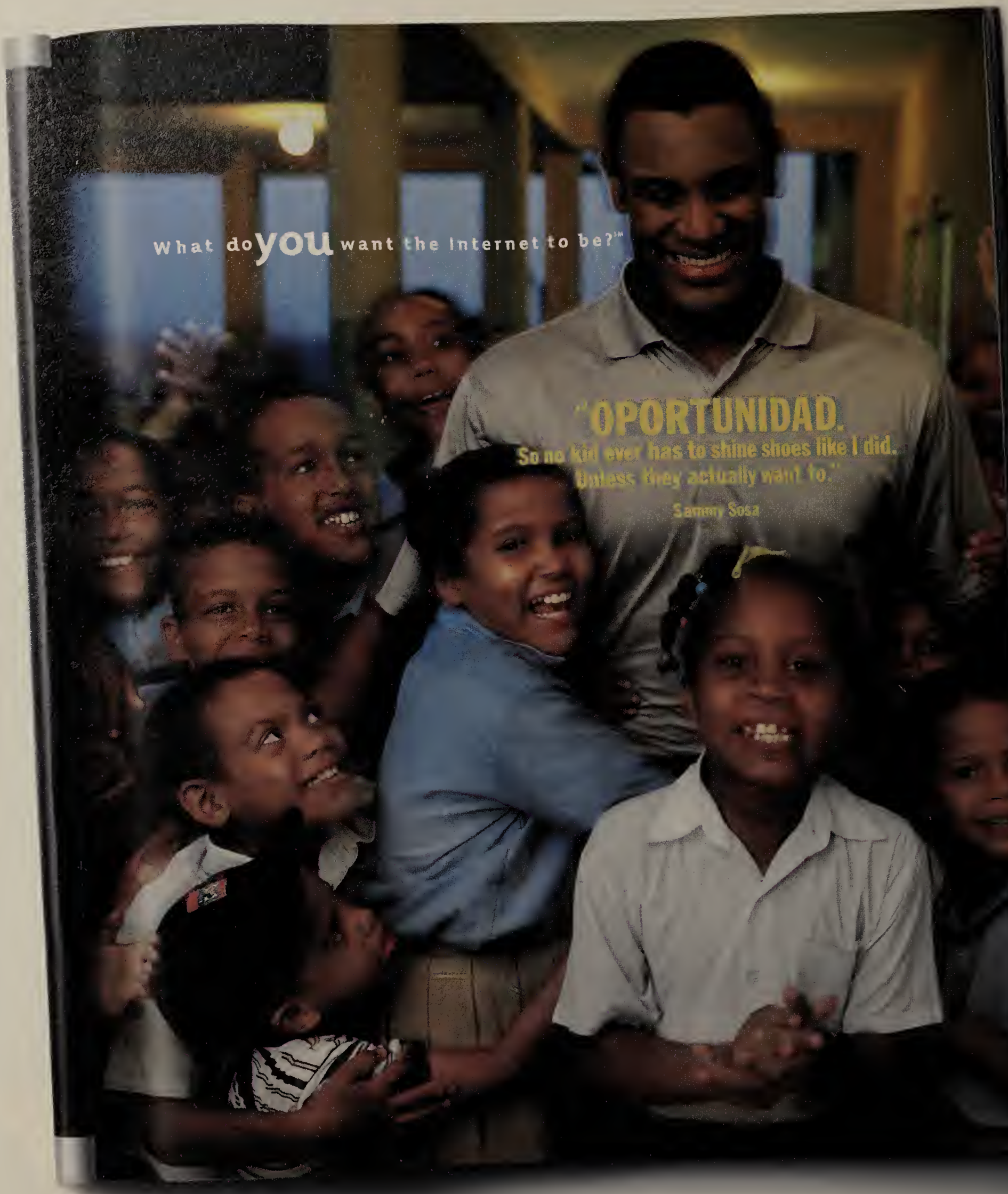


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# NetworkWorld

MAY 29, 2000

Page 8


**8** Battered **Novell** announces major restructuring.

**8** **Sun** enters high-end network-attached storage market.

**10** **SuperComm**: Not just for carriers anymore.

**10** **Tivoli** outlines a series of new SAN products and alliances at Planet Tivoli customer conference.

**12** **CacheFlow** and Exodus team to offer Web site performance testing.

**12** Concord Communications' **MyHealth** groups net management tools in a single console.

**14** **Cisco** creates division dedicated to delivering products for customer-contact center.

**85** Microsoft provides flexibility for **Outlook** security patch.

**85** **RealNetworks** previews newest streaming wares.

Page 14

## Infrastructure


**17** Boston hospitals using the Web to extend **patient care**.

**17** **Novell** enhances Internet mail software with rules-based engine and list server that can handle 500,000 subscribers per list.

**20** **VA Linux** targets low-end Web server market.

**20** **Packeteer, Microsoft** teaming on QoS.

**20** **Veritas** increases NT storage options.

**26** **Kevin Tolly:** New world math.


SPECIAL FOCUS: DIRECTORY SERVICES. *Members of DEN task force keep a low profile as they link directories and policies.* **Page 28.**

## Carriers & ISPs


**31** **AT&T Wireless** adding Web, data options.

**31** Start-up **TalkingNets** to wholesale voice over IP.

**34** **David Rohde:** MPLS gives frame relay new extranet life.


## Enterprise Applications

Page 38


**37** **Start-up** Viquity launches hosted supply-chain applications.

**37** **E-commerce** management vendors making strides.

**38** **Review:** Blueflame lights fire under Web performance.

**41** **ERP-to-Web** software upgrade on the way from Impress.

**42** **Scott Bradner:** The price of kids.


## Technology Update


**47** **Service discovery** spans multiple platforms.

**48** **Gearhead:** Mass storage for the masses.

Page 65

## Management


**65** **Dicey ethical dilemmas:** Before you track employees' Web surfing habits, make sure your company has a clearly defined policy.


## SHOULD YOU HACK BACK?

*There are new tools on the market that let you fight back against a hack attack. But what are the ethical and legal implications of launching a cyber-counterattack?* **Page 52.**

MICHAEL SLACK

## Reviews

- **Cisco's new mid-market switches:** Cisco's new Catalyst switches offer excellent performance, but some of the quality-of-service features still need work. **Page 59.**

**Editorial:** Where the enterprise and carrier nets meet. **Page 50.**

**Daniel Blum:** Different strokes for different directory servers. **Page 51.**

**Winn Schwartau:** Commonplace complacence: It's always something. **Page 51.**

**Backspin:** Customization in The My Decade. **Page 86.**

**'Net Buzz:** SkillsVillage.com wringing big bucks out of corporate chaos. **Page 86.**


Net Know-It-All.....Page 8

Ask Dr. Intranet.....Page 47

Message Queue.....Page 50

Editorial and advertiser indexes.....Page 80



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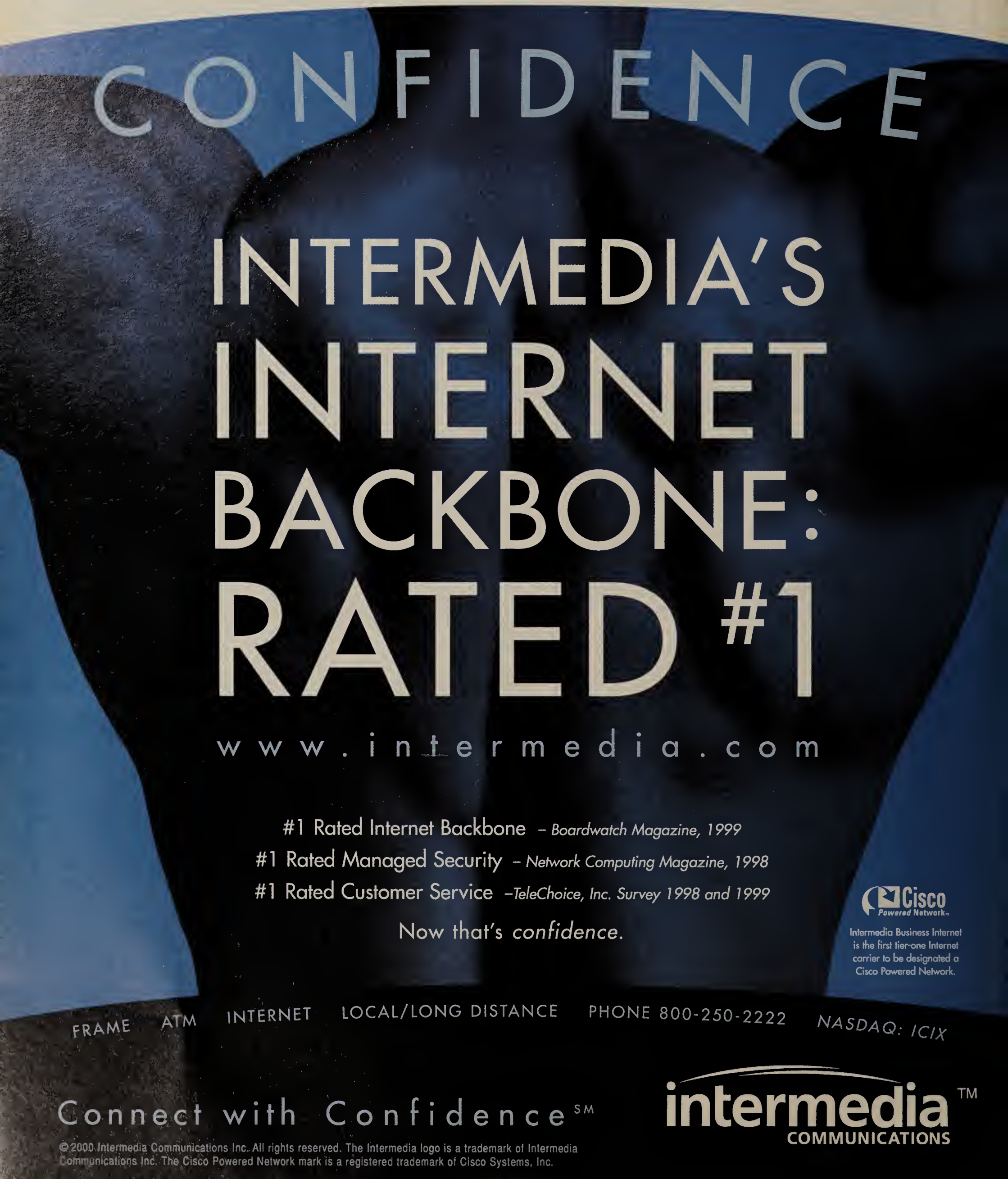
Boardwatch Magazine captured 4,512,463 measurements from 30 backbone providers to find out who's best.
Guess who came out on top?

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THIS WEEK ONLINE

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## RESEARCH

### Spider Bytes: The Web's best tools and tips

Convergence is great until you try to prepare your networks for it. We've got a series of case studies that will help you **(DocFinder: 8327)**:

- Widener University is undergoing a serious overhaul to its traditional voice and data systems. The university is hoping to improve its distance learning project and save some serious dough.
- The Panama Canal Commission installed carrier-grade FORE ATM switches for its convergence plan.
- Call centers can benefit from convergence technology. Find out how in a case study from 3Com.

### Newsletters

From the **"ISP Services"** newsletter, **DocFinder: 8328**

"Verio is buying Cisco Catalyst 6500 series switches to deploy within its 20 new hosting centers throughout the country. The switches may also be retrofitted into Verio's existing facilities. They will connect customers to the Cisco 12000 GSR routers in Verio's Internet backbone network."

Sign up for this and other free e-mail newsletters online at **DocFinder: 3850**

## FORUMS

**"It is too bad for all that [Microsoft] has rushed into their fix without more effort. Hopefully, Microsoft will provide the levels of security needed in the future for today's vast e-mail world."**

*— From the "Outlook patch overkill?" forum,* ***DocFinder: 8329***

## SEMINARS & EVENTS

### Convergence Conundrum

Need a little help sorting through convergence technologies and solutions, as well as practical ways to apply them? Sign up for the Network World Reality Check on Convergence today. **DocFinder: 5526**

## BARNEY'S RUBBLE

*The best of the NetFlash daily newsletter*

### IT pros finding new careers as dot-com CEOs

Are you an IT pro who gets insanely jealous every time some pimply-faced start-up nerd makes a mint? Well, what are you waiting for? It turns out that you have just as good a chance of heading up a dot-com as those kids with their greasy hair and Oxy-5. And many of you IT types are already getting on the dot-com bandwagon, taking over as the CEO of companies such as Buzzsaw.com. Let's face it, with a little technical savvy, some market knowledge, an ability to manage and some business sense — you got it all, baby! **DocFinder: 8336**

### Time Warner launches e-book venture

Time Warner wants to give the e-book market a little kick in the pants. The media giant plans to have a new division that will display published works and act as a distribution point for online book outlets. I don't know about you, but after I've slogged through *Crime and Punishment*, I want it right there on my bookshelf so all my friends can see how smart I am. You can't do that with an e-book, now can ya? **DocFinder: 8337**

### Videos rock the Web

It used to be that you could watch videos on MTV. Now all the station seems to care about is its brain-dead lineup of dull reality shows like "Real World" (a bunch of 20-somethings squabbling in an apartment), and "Road Rules" (a bunch of 20-somethings squabbling in a Winnebego). So where do you turn if you want to kill a few minutes watching a video or two? The Web, that's where. Rockwindow will serve you up all the videos you can stomach for just $2.95 per month. **DocFinder: 8338**

*— Doug Barney, executive editor, news*

**Sign up for this e-mail newsletter online. DocFinder: 3850**

## COLUMNISTS

### Compendium

*Stuff you need to know*

Who's stealing Mr. Potato Heads in Rhode Island; what's the use for a blenderphone; and how rude is it that Time Warner is spying on its competition in Houston? **DocFinder: 8331**

### Cheat Sheet

*Sticking with Novell*

Does your boss want you to toss out your NetWare for Windows 2000 or Linux? We've put together a list of reasons for you to stick with Novell, including reader testimonials. Print it out, and hand it to your boss. **DocFinder: 8330**

### Help Desk

*NAT vs. PAT*

**Problem:** A reader needs access to applications outside the corporate firewall. Which is better: network address translation or port address translation? **DocFinder: 8332**

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We've made it easy to access articles and resources online. Simply enter the four-digit DocFinder number in the search box on the home page, and you'll jump directly to the requested info.

# NEWS BRIEFS, MAY 29, 2000

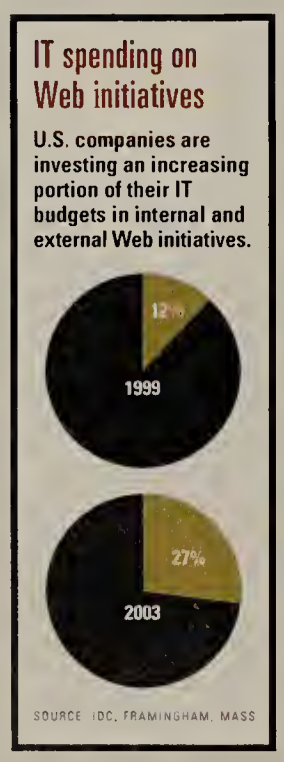
### Online privacy debate rages

The debate over how best to enforce online privacy reached a fevered pitch last week, with the Federal Trade Commission seeking to establish standards for Web sites and the power to enforce them. The White House, meanwhile, favors having the nascent e-commerce industry continue to police itself. Lawmakers stepped into the fray with hearings on the latest legislative proposals to protect consumer privacy on the Web.

At week's end, Washington powers remained split on Internet privacy with no compromise in sight. Even the FTC admits industry self-regulation is working, with 88% of Web sites posting privacy policies compared with 14% in 1998. However, many of those policies are incomplete and confusing. The FTC wants to see Web sites establish privacy policies that notify users about how their personal data will be used, let consumers choose how they want their information used, give users the right to review data gathered about themselves and detail security measures to prevent unauthorized disclosure.

### Web getting a bigger slice

New research from IDC in Framingham, Mass., confirms what many of us already suspected: Web-related initiatives are consuming a growing portion of corporate IT budgets in the U.S. Last year a shade more than 12% of all U.S. IT spending was on Web projects. IDC expects that to more than double to 27% by 2003, when such spending will exceed $282 billion. "More important than the amount of money industries spend on the Web is the changing ratio of their Web spending to overall IT spending," says Christian Silva, an IDC analyst. "This ratio tells how deeply Web technology is penetrating existing, inward-facing IT infrastructures as well as the industry's adoption of outward-facing e-business and e-commerce."




### Disney settles with GoTo.com

Walt Disney Co. has agreed to settle a trademark lawsuit with Internet search engine GoTo.com for $21.5 million and to change the logo of Go.com, a Disney-owned 'Net portal and search engine. In February of last year, GoTo.com filed a trademark infringement lawsuit in U.S. District Court in Los Angeles alleging Disney's circular green logo that said "Go.com" was too similar to GoTo.com's circular logo. In January, a federal appeals court barred Disney from using the Go. com logo while the lawsuit was pending. Disney replaced the logo with the words Go.com and an arrow. The settlement was officially signed last week. "We decided the best course of action was to settle and focus on Go.com's future business," says Michelle Bergman, a spokeswoman for Go.com.

### IBM rolls out Linux server

IBM last week made another overture toward the Linux community by introducing a 64-way Pentium server that can run the open source operating system. The company announced the availability of NUMA-Q E410, a box capable of handling complex tasks such as data warehousing and business intelligence. The machine has up to 64G bytes of memory and comes with the Non-Uniform Memory Access architecture (NUMA), which IBM obtained from its recent acquisition of Sequent. The NUMA-Q E410 comes with two to 64 700-MHz Intel Pentium III Xeon CPUs. It's currently available starting at $69,000.

### Cabletron unloads Digital net gear unit

Users of network gear from Cabletron's Digital Network Products Group (DNPG) again find themselves in the position of hot potato, as the company last week sold its Digital network unit to a private investment firm. Cabletron sold its DNPG operation for an undisclosed amount to Gores Technology Group, a Los Angeles technology investment firm, which will continue to offer and support DNPG products to existing customers. Cabletron bought DNPG from Digital in February 1998 for $430 million. The company had been trying to sell the unit since April as part of its strategy to split into four operating companies. Cabletron estimates that DNPG has an installed base of approximately two million network products worldwide.

### Axent lands big Xerox contract

The European office of Xerox last week awarded a five-year $20 million contract to security vendor Axent Technologies to ensure its internal network and Web servers represent a "secure digital environment" for access by up to 100,000 Xerox Europe employees, customers and suppliers. Axent will deploy its security products, including firewalls, intrusion-detection and secure token devices, and provide managed security services for all of Xerox's European offices.

# Battered Novell lays out internal restructuring

*Company to focus on Internet opportunities.*

BY DENI CONNOR

Financially battered Novell last week reorganized into four business units charged with focusing on new Internet-related opportunities, as well as Novell's traditional base of network staples.

After three straight quarters of lackluster income reports, company officials said it was necessary to reorganize into the following divisions:

- Net Management — centered on the enterprise and product staples, such as NetWare, GroupWise, BorderManager, ZENworks and storage services.
- Net Content — focused on service providers, hosted services and the company's OnDemand Services, as well as NetPublisher, DigitalMe and Novell Internet Messaging System.
- Net Directory — aimed at large companies and dot-coms, which will include eDirectory, Schemax and Single Sign-On products, as well as metadirectory DirXML and e-commerce iChain products.
- Net Customer Service, which includes consulting services, technical support and education.

See **Novell**, page 81

# Sun debuts network-attached storage gear for high end

BY DENI CONNOR

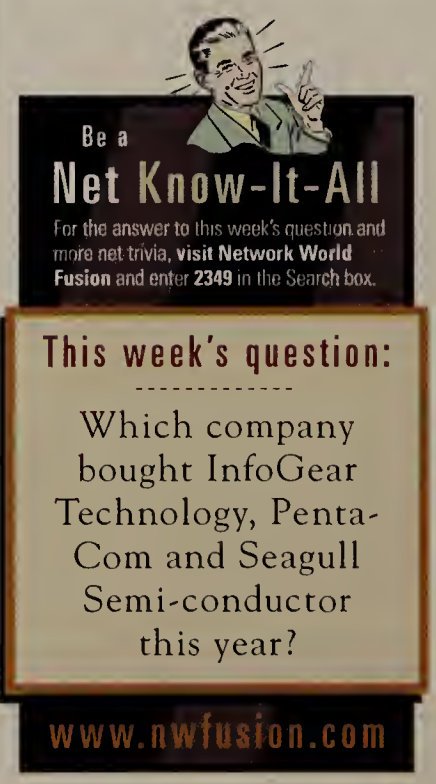
Sun entered the high-end network-attached storage (NAS) market last week with a family of file servers that let network managers at dot-com companies, enterprise workgroups and service providers add up to 10 terabytes of storage to local Ethernet networks.

The Sun StorEdge N8000, 8400 and 8600 are NAS appliances that span low-end workgroup use to high-end corporate use. They have capacities that range from 200G bytes to more than 10 terabytes of storage. The entry-level N8000 is available now; the high-end 8400 and 8600 will ship in July.

IDC, a market research firm in Framingham, Mass., expects the rapidly growing NAS appliance market to exceed $3 billion by 2003. Network Appliance and EMC have dominated the enterprise segment with a number of smaller file server vendors, such as Quantum and Maxtor, on the low end.

Sun's chances of making a dent in the high-end NAS market are good, analysts say. Steve Duplessie, an analyst with Enterprise Storage Group in Milford, Mass., says Sun made a half-hearted attempt at penetrating the NAS market two years ago

See **Sun**, page 81



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# SuperComm: Not just for carriers anymore

BY TIM GREENE

*ATLANTA* — With the blurring of the line between enterprise and public networks, the SuperComm 2000 show next week will be a must-watch for corporations. This year, the traditionally carrier-focused show will go out of its way to highlight products and services for corporate networks.

SUPERCOMM 2000

Part of the SuperComm 2000 show floor will be dedicated to communications gear for companies with a focus on voice, video and data convergence.

Dubbed the Enterprise Communications Zone, this section will embrace products and services familiar to enterprise executives: hubs, routers, call centers and multilayer switches, just to name a few.

Likewise, a separate section will be set aside for carriers and ISPs to hawk their enterprise network services.

Digital subscriber line (DSL) technology will make a splash, with demonstrations showing that the equipment is mature enough for the vast rollouts being planned by major carriers.

The demonstration will focus on asymmetric DSL and the ability for vendors' gear to interoperate based on the ADSL standard. That includes full-rate versions capable of 8M-bit/sec downloads as well as a simpler version that handles 1.5M-bit/sec downloads. Past interoperability demonstrations were limited, but this one promises any-to-any connectivity.

Voice over high-speed DSL circuits will also be hot at the show, with CopperCom, Efficient Networks, Net to Net, and partners Tachion and Vina Technologies promising product announcements. The technology can bring corporations low-cost bundles of voice, data and Internet access over a single line, streamlining ordering and provisioning.

To prevent these DSL access services from choking carrier nets, makers of optical gear have products they will introduce that can bring inexpensive gigabit bandwidth to local access networks.

Many of the upstart optical vendors, such as Astral Point, Corvis and Calient, will introduce new gear, new features and interoperability.

New carrier gear that promises to support efficient, flexible IP voice and data networks will also be unveiled.

Integral Access will announce new features that give its gear the ability to support IP phone calls, a key ingredient to converged network services.

Integral will announce that its PurePacket Node access gateway supports Multi-protocol Label Switching, which enables quality-of-service guarantees that make high-quality voice calls possible.

In addition, the company will announce its support for the Media Gateway Control Protocol, which lets PurePacket Node set up calls by conferring with a separate software-based voice switch.

Other makers of carrier gear will demonstrate new services that are possible based on their products. For example, IPVerse will show a wireless personal digital assistant that changes the call forwarding features of a phone service by connecting directly with an IPVerse phone switch. The IPVerse software-based switches are designed to be more flexible than existing phone switches in enabling new services.

A comprehensive demonstration of voice-over-IP technology will be staged by a group of 20 vendors including 3Com, Cisco and Copper Mountain.

The demonstration will feature services such as unified messaging, IP phone calls over traditional and IP phones, and the ability for customers to provision services themselves.

In addition, the show will boast keynote speakers such as AT&T President John Zeglis and Federal Communications Commission Chairman William Kennard. ◪

## SuperComm 2000 highlights

**This traditionally carrier-focused show will have a lot for enterprise network customers as well.**

**Enterprise Communications Zone**

A section of the show floor dedicated to voice, video and data applications for the enterprise, and how they can be supported by public networks.

**Conference sessions of note for enterprises:**

- Building Real IP telephony
- Threats to e-commerce
- Advanced VPNs

**Also of interest:**

- DSL Forum interoperability showcase

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# Tivoli customers hear company outline new plans for SANs

BY MARC SONGINI

*PHILADELPHIA* — On the heels of flat first-quarter financial results, Tivoli is mounting a wide line of attack on the network management market.

Last week at its Planet Tivoli customer conference, the IBM subsidiary announced a variety of storage-area network products and SAN alliances. In addition, Tivoli executives detailed plans to add more capabilities to mainframe-based management tools.

Tivoli will continue to supply companies with e-business products ranging from tools to manage mainframes to those that handle PalmPilots. Senior Vice President Bob Yellin told a keynote audience at the Pennsylvania Convention Center.

User reaction to the roadmap has been generally positive.

Karen Nickelson, an IS manager at Hewitt Associates, is particularly pleased with the way Tivoli is beginning to tightly integrate its product line with IBM software such as NetView. Hewitt, a large benefits management company in Lincolnshire, Ill., has a 12,000-user network and a variety of Tivoli products to handle software distribution, events manage-

See **Tivoli**, page 81

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# CacheFlow, Exodus offer free service

BY APRIL JACOBS

Ever wonder how much faster your Web site could be with a little added cache?

Service provider Exodus and device maker CacheFlow think they have the answer with a new service to measure your network's performance: before and after caching.

The program doesn't require you to add a caching device, alter your network or change your service provider. Instead, Exodus' Service Metrics subsidiary will measure how fast your e-commerce or business-to-business site responds to customer requests. Then CacheFlow and Exodus will add CacheFlow devices, which store content to speed delivery, at an Exodus data center. Exodus will retest your site, and show exactly how much faster it is with caching.

Both tests are free, says Greg Govatos, marketing director at CacheFlow.

Exodus' SM-WEB monitoring tools, along with the company's worldwide network of data collection agents, measure end-user response times many times each hour.

Govatos says the tests can also look at factors such as application and server performance.

Observers say the service should strike a chord with IT managers who want proof that edge devices like caches and content-delivery services quicken response times. Such performance is critical in the e-commerce and business-to-business markets, where long waits can mean lost business or reduced productivity.

Greg Howard, an analyst with HTRC Group, says these services will grow during the next year. By the same token, so will the use of cache devices themselves, which help reduce server overload.

These types of testing services may be a requirement in the future. "The hosters are going to have to provide guarantees that their networks are performing the way they say they are going to perform. Objective metrics are important from both a billing and customer retention point of view," says Cindy Borovick, an analyst with IDC in Framingham, Mass.

CacheFlow: www.cacheflow.com

## Cache money

**The market for Web caching devices exploded last year, and analysts predict the market will more than double again by year-end.**

SOURCE: JUPITER COMMUNICATIONS, LOS ALTOS, CALIF.

# Concord's MyHealth ties net mgmt. tools together

BY PHIL HOCHMUTH

*MARLBOROUGH, MASS.* — Even with good network management software and a competent IT staff, it can be hard to see the forest for the trees when it comes to solving network problems in a large organization.

Concord Communications this week is introducing its MyHealth management and reporting software, which will allow users to tie together existing Concord management products and view overall network health from a single console.

MyHealth links Concord's recently acquired Empire SystemEDGE and FirstSense Enterprise management products along with the company's original Network Health management offering, providing a single interface to manage network performance and produce reports on everything from network servers, routers and switches to enterprise applications.

According to Christine Washburn, Concord's vice president of marketing, MyHealth will eliminate the runaround IT staffers can experience when trying to solve system problems using reporting tools that only see one aspect of a network.

"When enterprise users say they have network problems, it can be an application response problem a lot of the time," Washburn says. "But things could be slow because of a system or network problem. Until you had all three aspects of your network in the same [interface], it was really hard to figure out why the network was slow."

MyHealth software can monitor mixed environments where network protocols may differ, switches and routers from different vendors are present and server operating systems are varied. The software can also tie the performance of legacy systems into reports, as well as measure the quality of services from outside service providers.

According to Washburn, the value of MyHealth can be seen most during IT budget planning.

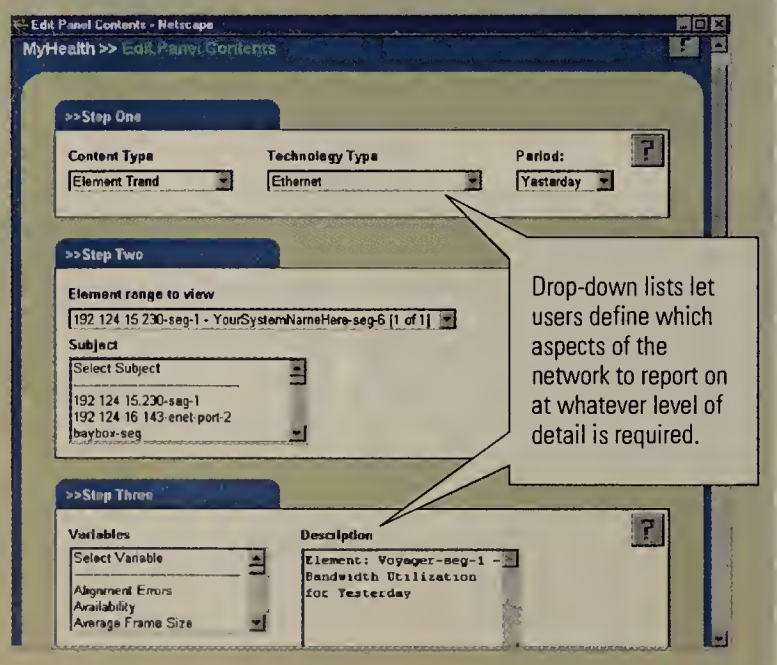
"If there are [network] problems, you need to document exactly why you need more money to buy more equipment — maybe it's because your present routers or servers are maxed out," she says.

MyHealth runs on Windows NT or Unix, and requires either the SystemEDGE or FirstSense monitoring tools to be installed on a network. MyHealth will ship at the end of June and costs $5,000.

Concord Communications: www.concord.com

## Get your network's health report

**Concord Communication's MyHealth network monitoring and report software lets users view and generate reports on specific nodes in the network, or on the enterprise as a whole.**

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# Cisco targets call centers, unified messaging

*Company creates division dedicated to delivering products for customer-contact center.*

BY ELLEN MESSMER

*SAN JOSE* — Cisco has organized a new division called the Internet Communications Software Group to expand its product line in two areas: customer-contact centers and unified messaging.

The division's Customer Contact Business Unit in Lowell, Mass., brings together two companies Cisco purchased. These companies are WebLine Communications, which specializes in software for Web-based customer service, and GeoTel, which markets software for routing incoming customer phone calls to appropriate customer service representatives.

***"Our uOne [voice messaging product] software platform will eventually support XML on the back end to enable transactions on the Web."***

Eugene Lee, vice president of marketing, Cisco

The second business unit, dubbed the Unified Communications Software Business Unit, has its roots in Cisco's acquisition of Amteva, which developed what is now the Cisco Unified Open Network Exchange (uOne) voice-messaging product.

In the Customer Contact Business Unit, Cisco plans to build a software platform that will be able to integrate Web-based e-mail, chat, IP-based voice and collaboration capabilities with the phone-based customer-relationship management applications found in call centers. The applications frequently found in call centers are from vendors such as Siebel, Clarify, Oracle, PeopleSoft and Baan.

According to AMR Research, those vendors' total sales reached $1.57 billion last year and are expected to climb to $2.5 billion this year. That's hardly the total market, though, because a category of "others" — including Web-focused start-ups such as Cisco's WebLine — accounted for another $2.2 billion last year.

These established application vendors face a formidable challenger in Cisco. However, Eugene Lee, vice president of marketing for the Internet Communications Software Group, is emphasizing a strategy in which Cisco expects its products to coexist with products from Oracle and PeopleSoft in the call center.

However, Cisco does plan to compete with Lucent PBX and Nortel automated call distribution equipment, and any vendor that makes the time-division multiplexers used in call centers. Upcoming Cisco products will offer a platform for converging voice and IP, Lee says.

In the arena of unified messaging, Lee says Cisco plans to extend the capabilities in the uOne voice messaging product to provide universal access to Web content from a phone. "Our uOne software platform will eventually support XML on the back end to enable transactions on the Web," Lee says.

Cisco isn't publicly setting a delivery date for that kind of functionality yet, though. ◪

**Chambers,**
continued from page 1

well and will serve us extremely well going into the future. So we outlined to the market why we were moving into [Web switching], we outlined the size of the market, we outlined what our strategy would be and what additional follow-on activities would most likely occur. Then we said the market's going to decide can we execute well within this space. The market looked at it, and while the price tag was very high for it, they felt that our execution and our strategy was very good, and in the market the stock reacted very well.

**How would the changes being considered to the pooling method of accounting hurt Cisco's ability to grow through acquisition?**

[The Financial Accounting Standards Board] is in a tough scenario in that they're trying to apply Industrial Revolution processes to this Internet revolution with nobody having a roadmap. And my key issue is, 'Here, let's move slower and let's not underestimate the decision that we can make on accounting principles and the effect it could have on the economy.'

Most government agencies have let business lead and moved slower in these areas during periods of change when it's so uncertain, and I'm cautiously optimistic that FASB will do the same.

FASB took a very strong stance and now getting them to change, like getting politicians to change, is very difficult.

Will it change my acquisition strategy? Yeah, it will. It will slow it down. And I'll pay less. Now think about what I just said. What impact would that in and of itself have on the market if others do the same? So we're making economic decisions off of our accounting principles. What we're trying to do is apply old-world processes to this new world.

PHOTOS: ED CALDWELL

**Is Cisco's ability to acquire and assimilate companies replacing its ability to innovate?**

Oh, there's always going to be that constructive challenge in the industry. I'd disagree with it, dramatically. Two-thirds of our products come from internal development. It's just that nobody likes to write about them.

I mean, look what [we] did with cable; look at our [GSR] 12000. It outgrew its nearest small competitor 60% quarter over quarter last quarter. Look at the [Catalyst] 6500, which is an outgrowth that has been in our technology for seven years. It grew in excess of 20% quarter over quarter. It has a $3.3 billion run rate. So we will get probably two-thirds of our products, give or take 5%, from internal development and one-third from partnering or acquisition.

Everybody likes to write about the acquisitions because most of our competitors fail.

**The enterprise business was up 20% sequentially in the last quarter. Is that a one-time event or will that be sustainable?**

It won't be sustainable at 20% quarter over quarter. But you are seeing enterprise customers understand the role that technology's going to have on the future of their business and their survivability. As they understand that they are absolutely going to spend more money on technology.

Also, the distinction between our enterprise business and service provider business is very difficult to see. Whether enterprises outsource to a service provider, keep [their networks] internally or combine the two, it is still largely enterprise business. And it's the enterprise customers that are driving a large part of our service provider capabilities. Part of the reason SBC went with us is our ability to bring enterprise customers to the relationship.

Cisco's a company that's lucky and expects to be lucky, but you don't get much more lucky than when a very good competitor like 3Com withdraws from the market, while Lucent splits their business between service provider and

See **Chambers**, page 15

**Chambers,**
continued from page 14

enterprise at the exact time the market's going the other way. The only thing that would have been better is for Nortel to get out of optical. But that'd be asking too much.

**Do you view the Lucent and Cabletron spinoff maneuvers as exit strategies from the enterprise market?**

Our philosophies differ in terms of where the market's going. We think the lines are rapidly blurring between enterprise, service provider, small/medium, business and consumer. And we think there's going to be a lot of overlap of products, of distribution, of partnerships you bring to it. So our strategy is one that believes that those markets will be interrelated and that the products will be interrelated. Time will tell if we're right or wrong on that.

I think it is a strategy of making [enterprise and service provider] separate, which the financial markets may like in the short term. I have a different view on how the market will evolve.

**As Cisco becomes more dominant in the enterprise market and as your competitors drop out — and with 80% of the Internet router market — do you see any antitrust red flags?**

Well, I never use the term [dominant] that you just did in terms of defining the market. What we've been able to do is focus on a new data/voice/video market, of which we are less than 10% of the total market. And if you understand how big the market is and we're less than 10% by definition, as this market consolidates, I'd like to have the problem of being at 30% or 40% of the total market.

The second issue is we do not have the barriers to entry that many of the companies have had in this marketplace. This is an open-standard marketplace and if you look at our toughest competitors they are often start-ups with remarkably small staffs and revenue, and yet they can attract capital and move very rapidly.

The third element goes back to our philosophy: I don't give away anything. When we face a small competitor who's really good, you don't see us — even though it's legally acceptable — discounting dramatically on [the product]. We don't try to use our economies of scale to compete in a way that I would consider personally unethical.

**Do you see sales to RBOCs ramping up significantly in the near-term and eventually overtaking sales to ISPs and CLECs?**

The neat thing is that whole segment of the market is growing very rapidly with or without Cisco. The RBOCs have been a little bit slower to move than some of the other players.

What SBC really said to the market is, "This is the future. We're going to bet on the company we think can best position us to move into this new world. We're going to get very, very close to Cisco and it will be our data architecture, which over time will be data/voice/ video."

So when you have a player of that strength and that much respect saying that, that's like the enterprise customers when companies like Merrill Lynch, Citicorp and Chase went our way. They were the predecessors for what the whole market did. So if we execute well here that will probably be looked back on as a key event that really opened up the dam for Cisco to play in the arena in a big way. ◪

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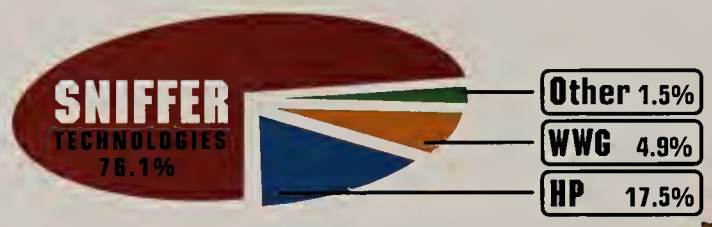


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*Source: IDC*

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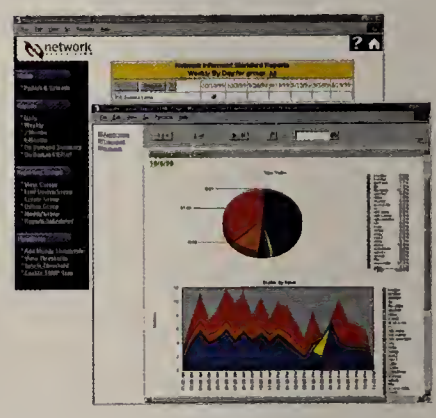

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**Nortel Networks** announced that IBM has integrated Nortel's Open IP Environment routing code with its Power Network Processor hardware. Nortel plans to roll out future products based on the Power Network Processor/Open IP integration, the company says. Power Network Processor is a programmable device that can be used to power a variety of network products. It enables equipment makers to implement and change features such as packet classification and modification. Nortel has secured more than 200 licensing agreements for Open IP Environment since November 1999.

Nortel: www.nortel.com

**Microsoft** recently released Service Pack 6 for Windows NT 4.0, Terminal Server Edition. The patch includes the latest Year 2000 updates, device driver, symbol files and Internet Explorer 5.0. The patch, which is not a recommended upgrade, also includes updates to security, user management and printing features. The service pack is available at www.microsoft.com/ntserver/terminalserver/downloads/recommended/tsesp6/

Start looking for next-generation enterprise telephony systems under the **Marconi** brand. The company, whose predecessor FORE Systems co-marketed an ATM-based PBX replacement switch made by Sphere Communications in Lake Bluff, Ill., has decided to brand the Sphere systems under the Marconi name. Sphere's latest release of telephony hubs, call-control servers and end-user client software, together called Sphericall.ems 3.0, now supports both ATM and Ethernet campus networks and provides extensive support for voice over a variety of WAN technologies.

Marconi: www.marconi.com

IN-SITE: *Lessons from Leading Users*

# Using the Web to extend patient care

BY JASON MESERVE

What's the prescription for tying six hospitals' legacy data systems together? This being 2000, the answer has to be the Web.

The task of tying multiple legacy systems together to give doctors a single point of access to more than one million patient records was at the core of a merger between Beth Israel and Deaconess hospitals in Boston. The two facilities — located only a block from each other — had separate mainframes that stored each hospital's clinical patient data. There were no means of accessing records from each hospital from a single interface.

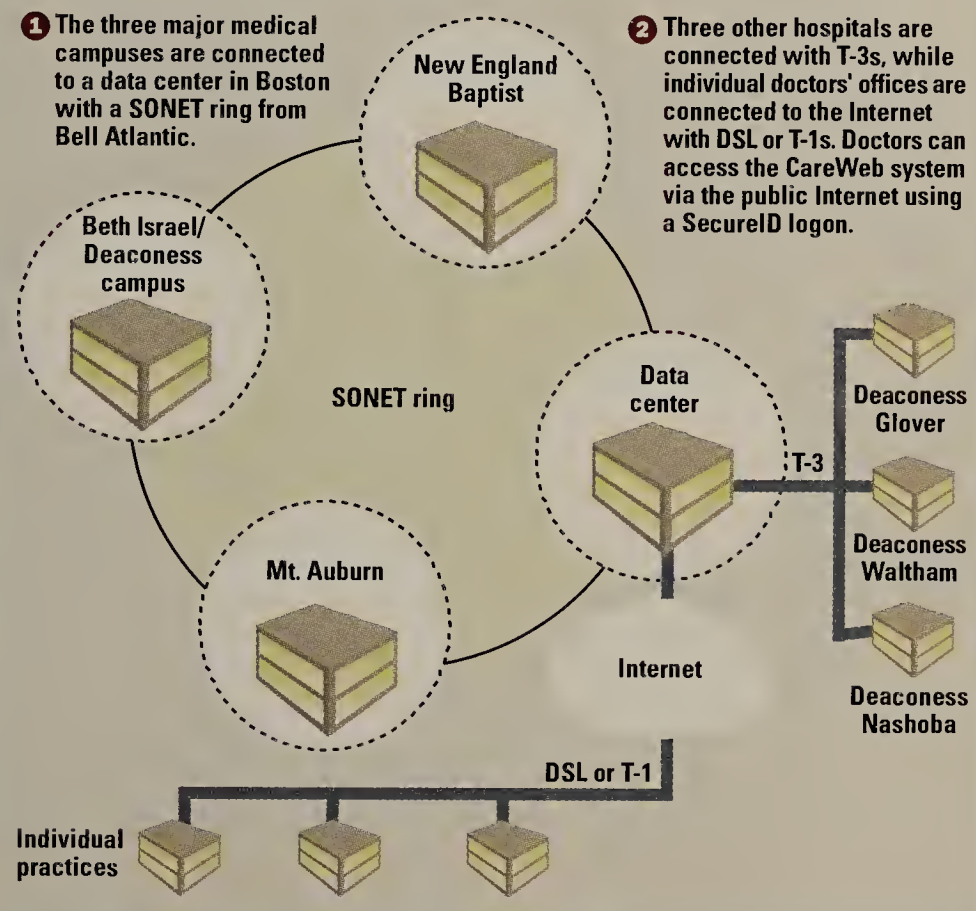
Add on top of that the four other hospitals that belonged to the newly formed CareGroup Healthcare System and the countless physicians who wanted access from outside their hospitals' walls and you have a data-access nightmare.

That was 18 months ago, before CareGroup became acclimated to the Web, thanks in part to Dr. John Halamka, chief medical information officer for the organization. Halamka took his position about a month after the project to integrate access to the vari-

See **CareGroup**, page 25

### CareGroup's network

**CareGroup, a network of hospitals in the greater Boston area, uses a Web interface to link the clinical data store at each of its six hospitals. The Web-based technology allows previously incompatible legacy systems at the separate sites to share data and act as a unified system.**




# Novell beefs up Internet mail

*Adds rules-based engine, Linux and Solaris support, and list server.*

BY DENI CONNOR

The latest version of Novell's Internet mail package will make it easier for network executives to integrate messaging onto a single platform and manage larger volumes of mail.

The Novell Internet Messaging System (NIMS) 2.5, introduced last week, has several new features; among them the addition of a rules-based automation engine and support for Sun Solaris and Linux servers. Previously, NIMS only operated in Windows NT and NetWare server-based networks. In compliance with its Directory-Enabled Network Infrastructure Model strategy, which says all Novell products will operate cross-platform, NIMS now operates on four platforms: Linux, Solaris, NT and NetWare.

NIMS users can now define and apply processing rules to incoming messages to automatically copy, move or delete messages based on the sender, recipients, message subject, body text and other parameters. For instance, if a user wants to automatically delete all messages from a recipient without first reading them, he could create a rule that says, "When you receive a message from cheapmortgages@hotmail.com, delete it." NIMS will act on the rule, and when it receives messages from that sender, it

See **Novell**, page 25

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# VA Linux targets low-end Web server market

BY APRIL JACOBS

*SUNNYVALE, CALIF.* — Linux server and software maker VA Linux Systems is taking aim at companies looking to scale their existing Web server farms or start one with a new low-priced server package.

VA Linux's 2130 server is small (a compact 3.5 inches high) which is important for users with space constraints. Its $1,400 starting price gives companies an inexpensive way to dedicate servers for specific purposes such as content delivery and transaction processing.

The 2130 ships with VA Linux's version of Red Hat Linux 6.2. VA Linux adds tools such as server administration and customizes the Linux kernel for use on Web servers.

Observers say the ability to dedicate servers helps ensure that users get good response times, because a single server doesn't get overwhelmed handling multiple tasks typically required of larger servers.

"I spent a lot of money on dual-processor servers trying to build an extensive, stable server farm, but as time has gone by and the stability of the Linux platform has become more proven, it doesn't make sense any more," says Ric O'Connell, vice president of engineering at 1stUp.com, a San Francisco company that provides services for the free e-mail and Internet access market. "Now you can put high-end boxes where they are needed and go with lower-end machines for things such as serving static content."

John Dunkle, an analyst with Workgroup Strategic Services in Portsmouth, N.H., says more companies may continue to look at single-processor configurations as Linux becomes more pervasive on Web servers and dedicated server arehitectures are adopted.

"If you look at Web environments, not just one main server does everything. One may handle e-mail, another may serve up database content, and as a result, you are seeing a lot of Web clusters handling different segments of work, which is much more efficient than having a high-end server handling it all," he says.

Dunkle also notes that the VA Linux service and support included with the server could be attractive for companies with limited support staff and remote offices.

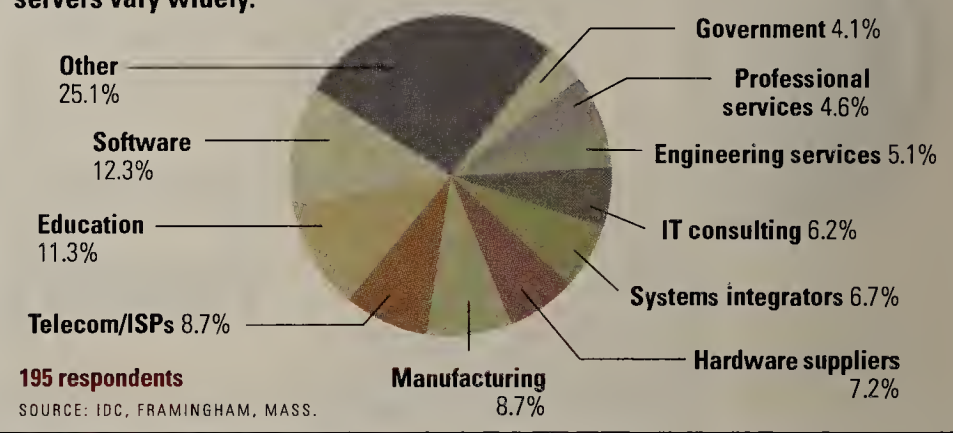
VA Linux says it's trying to give users some latitude in terms of horsepower. The 2130 can be configured with either an Intel Celeron processor or a Pentium III processor for more power. The 2130 also has up to 512M bytes of memory and supports a Gigabit Ethernet link. The 2130 is available now.

In addition to announcing the 2130, VA Linux also announced upgrades for its 1000 server, including an 800-MHz Pentium III processor and optional Gigabit Ethernet support.

VA Linux: www.valinux.com

### Linux lovers

**A 1999 survey shows that the kinds of organizations that have installed Linux servers vary widely.**




195 respondents

SOURCE: IDC, FRAMINGHAM, MASS.

# Veritas increases NT storage options

BY DENI CONNOR

*MOUNTAIN VIEW, CALIF.* — Veritas Software this week is expected to extend its storage management features to users of Windows NT and Windows 2000 servers.

The company will announce three new software packages for NT and Win 2000, which were previously only available for Unix servers. Dubbed Volume Manager for Windows 2000, Volume Manager for Windows NT 4 and File System for Windows NT 4, the software packages allow easier and more precise management, control and configuration of Windows network resources and files, while increasing the performance and fault-tolerant options for storage administrators.

Volume Manager for Windows NT 4 and its complementary package for Win 2000 let customers configure disk storage, and create and manage mirrored or RAID storage systems for fault tolerance. In mirroring, data is written to two or more disks simultaneously to increase availability and security.

### New Veritas offerings

**Volume Manager for Windows NT and 2000**

- More robust mirrored RAID configurations and improved storage management.

**File System for Windows NT 4**

- Optimizes NT file system for improved storage.

Volume Manager also lets disks be striped, in which portions of data are written across numerous partitions on several hard disks to ensure data integrity. In addition, the software lets administrators increase the size of volumes, cluster storage arrays and optimize storage without taking the system down.

Veritas also introduced File System for Windows NT 4. This software lets customers enhance the file system capability of NT to include database or messaging transaction rollback for increased integrity, recovery of files that may have been corrupted during operation and added storage capaeity without taking the server down. File System for Windows NT 4 also allows an administrator to recover a system quickly after system crashes.

Volume Manager for Windows NT or Win 2000 is priced at $1,000 per server and $700 per processor. The NT version is available immediately. The version for Win 2000 will be available in the fourth quarter.

File System for Windows NT 4 also costs $1,000 per server and $700 per processor. It will be available in June.

Veritas: www.veritas.com

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# Packeteer, Microsoft team on QoS interfaces

BY JOHN FONTANA

Microsoft is finally starting to get some support from network hardware vendors for the quality-of-service (QoS) interfaces it has built into Windows 2000.

The interfaces will allow applications to request a certain level of bandwidth from the network, therefore shaping traffic and giving more important applications the service they need to run efficiently. However, critics say that QoS controlled by applications is a Pandora's box.

Packeteer, which develops a family of application-level traffic management products under the name PacketShaper, recently announced it is adding support for the QoS signaling API that is available in Win 2000.

The hardware is the first to support the Generic QoS (GQoS) API that Microsoft developed as part of its new operating system. The API is based on two Internet Engineering Task Force standards. The API uses Resource Reservation Protocol, which allows applications to request an allotment of bandwidth from a policy server. GQoS-enabled applications use that protocol to communieate with PacketShaper.

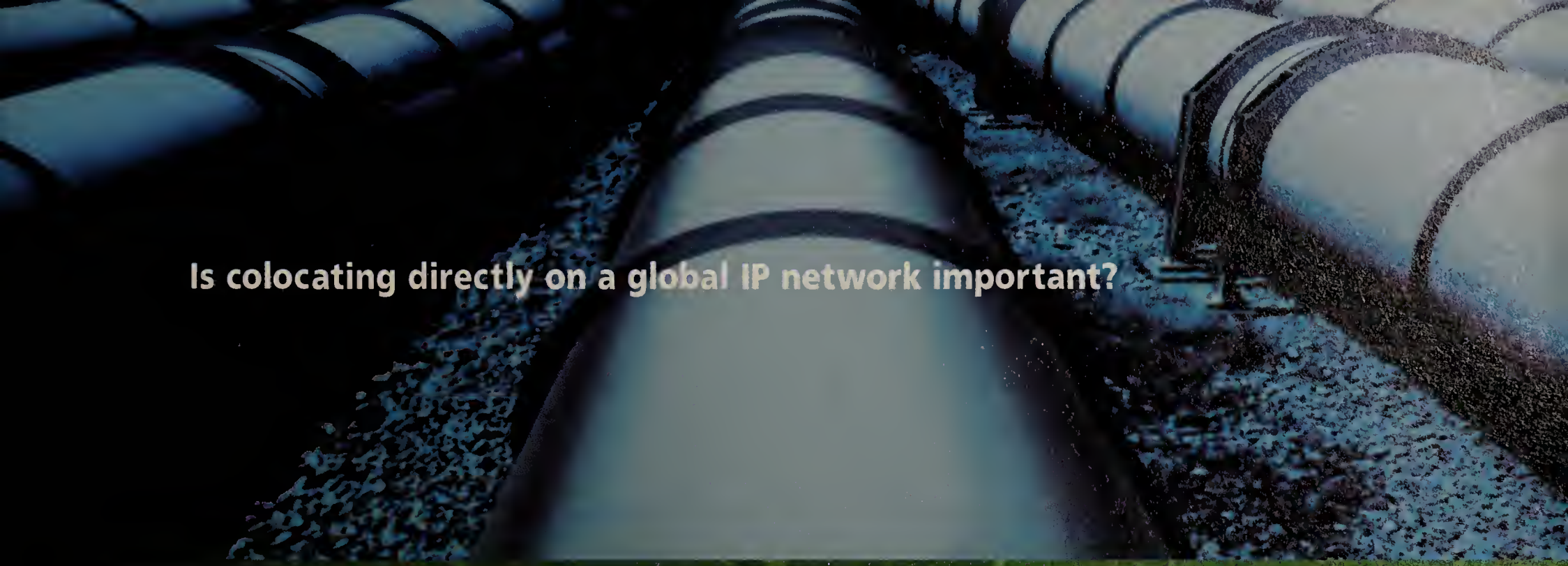
In addition, the applications use Differentiated Services to mark packets with policy data.

### Departing from history

QoS mechanisms historically have been confined to hardware such as routers and policy servers. Microsoft's unique approach to QoS lets applications tell the network that users are requesting bandwidth and the amount they need.

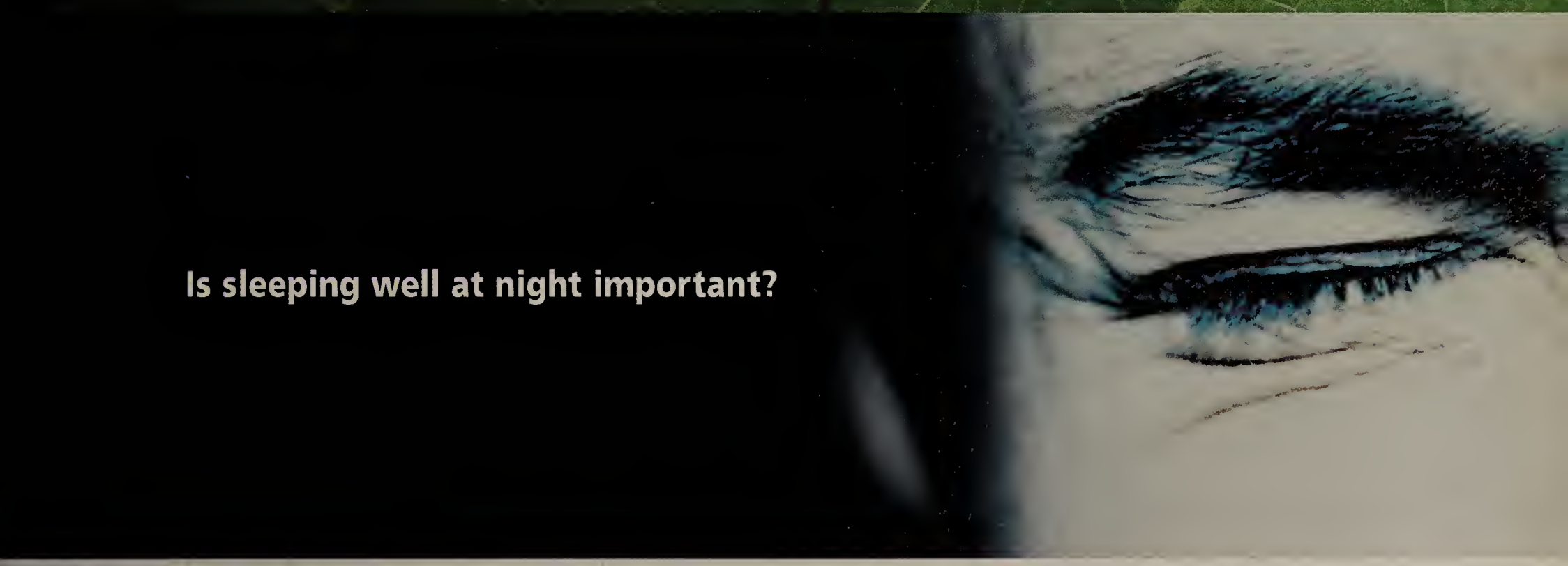
However, there are limitations to application-based QoS requests. Namely, they lack traffic management features needed to determine if a request can

See **Packeteer**, page 24



Is colocating directly on a global IP network important?

Is guaranteed connectivity and reliability important?



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**Packeteer,**
continued from page 20

actually be accommodated.

Critics say applications that request bandwidth know nothing about network traffic flow and, therefore, may request more bandwidth than is available. The situation could leave QoS policies in shambles as the network tries to fill bandwidth requests from applications.

"The good news is that applications know what they need from the network, but the bad news is there needs to be a traffic monitor," says Mike Howard, principal analyst and founder of Infonetics Research in San Jose. "The traffic monitor problem has to be solved."

### Problem acknowledged

Microsoft officials acknowledge the issue and say GQoS complements traffic monitoring by offering a smart host that can mark traffic, identify users and make applications aware of the network.

"I would not turn my network QoS over to my applications," says John McConnell, president of McConnell and Associates in Boulder, Colo. "You should keep policy decisions where you can control them, and that's not at the desktop."

PacketShaper will provide the policy decisions for applications, sitting in front of network switches and enforcing policies. The hardware includes the intelligence to determine if the network has the bandwidth to fill requests. PacketShaper has three critical features that support GQoS-enabled applications. First, it can analyze network traffic to determine who is using what bandwidth and when. It also can control traffic by assigning policies, monitoring those policies and warning when they are ineffective.

### New PAQETS

Packeteer is developing Packeteer Application QoS Enabled Traffic Signaling (PAQETS) to support Win 2000 GQoS and user authentication. Packeteer plans to add PAQETS support to PacketShaper and a similar product called AppVantage, which is intended for application service providers.

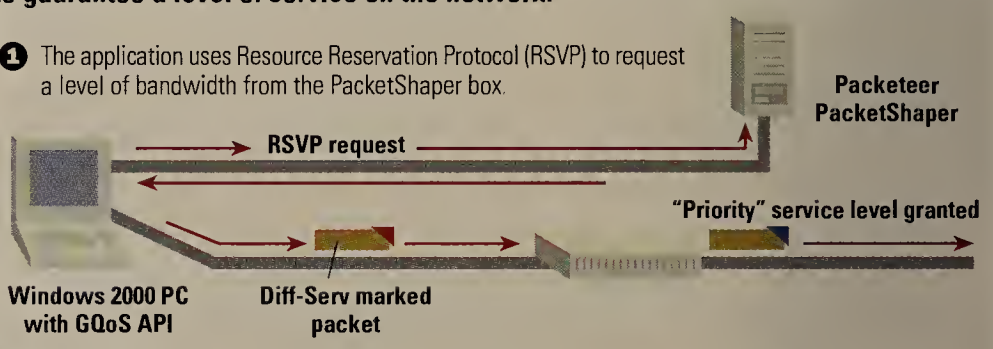
Packeteer says application-level signaling could be an advantage for IPSecurity traffic because PacketShaper will never have to look inside encrypted packets to determine what kind of QoS policies to assign. The application will provide that data.

With Packeteer on board, Microsoft must now begin to solve the other side of the equation — applications. Currently, only Microsoft's NetMeeting and NetShow support GQoS, but SAP in the next version of its R/3 applications will support the API.

PacketShaper with support for Win 2000 GQoS is expected to ship in the fourth quarter of this year. Pricing has not been set.

## Application-based QoS

**Packeteer is the first hardware company to announce support for Microsoft's Generic QoS (GQoS) API. The API allows applications to request a certain amount of bandwidth to guarantee a level of service on the network.**




1. The application uses Resource Reservation Protocol (RSVP) to request a level of bandwidth from the PacketShaper box.
2. After receiving an OK from PacketShaper, the application marks the packets it sends out on the network using Differentiated Services, another Internet Engineering Task Force protocol. Diff-Serv packets are interpreted at network switches and given the desired level of service.

**CareGroup,**
continued from page 17

ous information systems got under way and knew the Web, rather than a client/ server approach, was the way to go.

"Eighteen months ago, we had no Web. Now everything is Web," Halamka says. "Our workstations that used to be client/server are now basically Internet Explorer 5."

Halamka figured the thin-client Web approach was much better than trying to push software updates to CareGroup's 7,000 desktops. Fortunately for Halamka and his staff of six programmers, each legacy system that needed to be integrated uses or interacts with InterSystems' Cache hierarchical database. This allowed all the data to be wrapped in XML and shared across the network, while keeping the individual systems in place. Halamka says some systems were retired or streamlined during the preparation for the millennium.

Using a hierarchical database for medical records is a much better option than a typical relational database, Halamka says, because each patient might have three tests, and each test may have seven components. This is more efficient in a hierarchy than in rows and columns.

The resulting CareWeb system now lets CareGroup's 3,000 doctors and 12,000 employees access patient data from just about anywhere. Records from each of the hospitals have been cross-referenced, making it easier for doctors to find information on the John Smith that checked into Mt. Auburn Hospital and the same John Q. Smith who was treated at Beth Israel Deaconess. Not only can the data be accessed from inside the hospital, but physicians can also get the information from remote locations using Cisco's Altiga virtual private network software, SecureID encryption and Secure Sockets Layer technology.

CareWeb includes homegrown portal technology for customizing its look and feel for individuals, and can be used by patients to access their medical records and check for drug interactions. Soon the site will let CareGroup patients pay their doctor bills online.

Employees can use the portal as well to check lunch menus, share bulletin board information and look up other hospital-related data. CareGroup even pulls insurance information from its partners to save employees and patients time when forms need to be completed.

Not only has the data access been simplified, so has the network, which was previously made up of a mix of Cisco and Cabletron equipment but now comprises all Cisco gear. A data center is connected to three of the hospitals, including the main campus, via a Bell Atlantic SONET ring. The rest of the hospitals are connected via T-3 lines (see graphic, page 17). The entire network has been built to allow for a maximum of three minutes of unexpected downtime per year, Halamka says.

To make sure all the systems work, Halamka tests them himself. Every Friday night, the doctor spends eight hours working in Beth Israel Deaconess emergency room treating critical patients.

"I have to use all my Web applications," Halamka says of his double duty as coder and doctor.

But what happens if the network goes down while he's working on a patient? "I am paged for IS-related items when doing patient care. However, patient

**Novell,**
continued from page 17

will delete them without user intervention.

"We are rolling out NIMS to about 6,000 users in our organization," says Chip DiComo, network manager at Hellman Worldwide Logistics in Miami. "We have a lot of mail coming in we want to control from a rules perspective. For example, if I get a message from my boss, I'd like NIMS to automatically page me."

Novell also added a list server to NIMS that allows up to 500,000 subscribers per list. "Hellman is a widely distributed company, and we may not know all the air freight people in the world," says DiComo, who had no method of contacting all parties before. "A list server would let them subscribe to an information source and get company updates."

NIMS is integrated with Novell Directory Services for e-mail account management, billing and maintenance.

The price for NIMS 2.5 is $20 per user. It will be available in June.

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Tolly on Technology . Kevin Tolly

# NEW WORLD MATH

Back when I was in school, parents always were bemoaning the difficulties of the "new math." Now I know how they felt.

It's not my kids' schoolwork that is doing it to me. It's Cisco. The recent purchase of ArrowPoint Communications for $6 billion clearly heralds the arrival of "new world math."

Usually when I see some unbelievable price being paid, I assume there is something very important in the deal that I don't know about. But this time, the deal is in a market I follow closely and, to put it bluntly, I just don't get it.

After the recent Nasdaq volatility, financial analysts are once more stressing value. Maybe there is a definition of the word that I'm not familiar with, but I always thought value meant getting something worthwhile for the money you spent. From that perspective, it is a function of price. No offense to ArrowPoint, but Cisco didn't get much value.

There are lots of ways to look at the numbers. Interestingly, I was hard-pressed to find media coverage that tried to dissect the transaction. Here's my take on the numbers.

In the May 8 edition of *USA Today*, the all-stock deal was valued at $6.1 billion dollars. (Cisco's announcement a few days earlier had it pegged at a mere $5.7 billion.)

Given ArrowPoint's 1999 gross revenue of $12 million, the company got a "premium" equal to over 500 times revenue. At $12 million per year, it would take Cisco 508 years to make back the $6 billion. I guess this is what's known as a long-term investment.

Clearly, Cisco expects growth. Rough math shows at a compound growth rate of 50% per annum, the company's total sales-since-inception would break the $6 billion barrier in about 14 years. That lengthens to 22 years if the growth rate compounds at only 25% annually.

There are other reasons to pay a lot of money for a company — product and patent portfolio, customer base, employee pool, recurring maintenance revenue, etc. But few of these seem to apply here.

When Cisco bought out IBM's networking business last year, it got rights to a rich patent portfolio, the best client list in world and virtually guaranteed sales in the billions . . . and paid only a little more than $2 billion.

We know that Cisco has a voracious appetite for employees. If getting the roughly 350 employees was a primary motivation, each head cost somewhere north of $17 million.

In the end, ArrowPoint is essentially a one-product company. It only started shipping product in late 1998 and has a tiny customer base. It doesn't sell core Ethernet switches, only the special Web switches that act as front-end servers.

This market is significantly smaller than the general purpose LAN switch market. And aggressive, high-performance LAN switch vendors Alteon, Extreme and Foundry have laid claim to this space as well.

Interestingly, at NetWorld+Interop 2000 earlier this month, not one vendor I spoke with saw anything amiss. Market insertion was one rationale for the deal. What are your thoughts?

*Tolly is president of The Tolly Group, a strategic consulting and independent testing company in Manasquan, N.J. He can be reached at ktolly@tolly.com or www.tolly.com.*


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# What happened to DEN?

BY JIM DUFFY

**DIRECTORY SERVICES**

***Members of vendor task force keep a low profile as they toil away on linking directories, policies.***

Almost three years ago, Cisco and Microsoft announced the Directory Enabled Network (DEN) initiative, which sought to develop a standard for storing information about network devices, applications and users in a single directory.

This directory would bind a user's name and network resource access profile to policies for granting or restricting that access, and delegating bandwidth priorities and privileges. Work on standardizing specifications for the directory were handed off to the Distributed Management Task Force (DMTF), which recently announced progress on its DEN efforts.

When the initiative kicked off in 1997 there were some network vendors that nodded approvingly and disclosed ambitious DEN-enablement roadmaps. But all has been pretty quiet on the DEN front for the past 18 months.

"There was certainly the big fluff when quite a few of the vendors all talked about using [DEN]," says John McConnell, president of McConnell Associates, a Boulder, Colo., network consultancy. "Part of this is going to remain slow until the [specification] comes together and there really is a standard way of exchanging this information."

"Everybody's been in a heads-down implementation mode," says Jim Turner, director of marketing for Cisco's enterprise management business unit.

In March, the DMTF announced it had completed work on a new version of the Common Information Model that facilitates the mapping of the CIM schema into a Lightweight Directory Access Protocol (LDAP)-compliant directory. CIM defines how to represent network device, system and application data in a directory so it can be easily shared for DEN and enterprise management purposes.

By mapping the CIM schema into an LDAP directory, users will be able to further integrate directory information into an overall enterprise management system, the DMTF says.

The organization has wanted to keep things quiet because publicity on progress with DEN standards would spur demand for supply-constrained technology, says Winston Bumpus, DMTF president.

"We purposely have kept the message low on DEN at this point because if we ramped it up, customers would be demanding stuff that they can't get their hands on," Bumpus says. "When we talked about it two years ago, people got excited and they thought they could run down to the store and buy it. I think that created more frustration than it did in solving any problems."

In the interim, users bought directory products that were not DEN-compliant. Accounting firm PricewaterhouseCoopers was one such buyer.

PricewaterhouseCoopers has a venture called Betrusted, which offers a secure business-to-business transaction environment. Betrusted uses a directory from PeerLogic to issue and store digital certificates for authorized users.

Betrusted is aware of the DEN work but is not dependent on it, says Geoff Grabow, chief technology officer.

"Right now we're in a crunch time because we're trying to finish the build and get our system up, so we're not paying too close attention to changing things in the marketplace," Grabow says. "We do have different people keeping an eye on different areas. It's not a priority at the moment."

Bumpus believes customers will make DEN-compliant products a priority once the DMTF makes a little more progress on DEN specifications — such as defining a policy schema that would specify data structures for binding directory profiles to network security and quality-of-service (QoS) policies — and products soon follow. Bumpus believes this will happen in the second half of this year.

"I don't see any major technological hurdles ahead of us," he says. "I think most of those for DEN are behind us. We're right on the edge of the logjam breaking."

## Goals of DEN

**Directory Enabled Network (DEN) is an industry initiative led by Microsoft and Cisco. It is open to network equipment vendors, common carriers, ISPs, independent software vendors and other interested parties. Goals of the project include:**

- Establishing an accepted information model for directory-enabled networks.
- Enabling unification of network management applications.
- Enabling personalized network services.
- Avoiding the proliferation of noninteroperable high-level schemas.
- Providing a foundation for building directory-enabled services.
- Preventing conflicts between vendor schemas.

Perhaps, but vendors still have to determine how to use directories to prompt networks and applications to configure themselves based on business policies, says Phil Edholm, vice president of architecture and chief technology officer for Nortel Networks' enterprise product portfolio. For example, when a user logs on to a network, the directory would recognize the user's name, department, location and rank within the company, and bind this information with the user's network access or restriction policies. Then the IT infrastructure would configure itself accordingly to enable or disable that access.

"The connections between the directory representations [of users] and actually driving configurations into the network have not come along as far," Edholm says. "We as an industry haven't made that connection yet. Using a directory just as a place to store data for the network doesn't buy you much."

Edholm says this snag is another reason why DEN has been silent over the past 12 to 18 months. Also, the benefit of DEN for enterprise QoS has disappeared, he says.

One of the killer applications for DEN when it was announced was the ability to link QoS policies to users via directories. But bandwidth has become cheaper and more plentiful in the LAN over the past two years, and that's made QoS much less of an issue.

Instead of prioritizing bandwidth allocation, users can inexpensively overprovision bandwidth when they need to support delay-sensitive traffic such as voice and video. Also, simple mechanisms such as setting 802.1p bits on Ethernet frame or type-of-service bits in IP headers are enough for LAN QoS.

"What users have figured out is that simple type-of-service mechanisms are probably sufficient for QoS," Edholm says. "And that's meant that the real sophisticated granular operation that directories were supposed to enable has become less important."

Nonetheless, there's still a huge demand among enterprise users for directories to enable self-configuring networks based on business policy, Edholm says. Nortel is currently shipping two DEN-type products. The company has bundled Netscape's Mission Control directory with its Contivity Extranet switch; and Nortel has integrated Novell Directory Services with its Optivity Policy Services suite policy management software.

DEN for QoS may still apply for WAN applications, Edholm says. Indeed, Nortel rival Cisco has made more strides with DEN in the service provider market than in the enterprise arena.

Cisco recently announced Cisco Networks Services, a software developer's kit that allows users to develop applications that share data with Cisco IOS-based devices. Cisco Networks Services includes the DEN CIM and Microsoft's Active Directory. Future Cisco Networks Services releases will add directories from Novell, Software.com, Sun-Netscape Alliance and IBM.

Service providers are looking to DEN to integrate multivendor products into an interoperable operational support system, says David DiGirolamo, senior manager of product marketing at Cisco.

As for the enterprise, Cisco has been building directory services into its QoS Policy Manager and User Registration Tracking tool, which binds users' names to media access control, IP, virtual LAN and port addresses, Cisco's Turner says. Cisco has announced "incremental" versions of these products as building blocks to fully DEN-enabled offerings, he says. The company expects these and other products to become DEN-compliant in early 2001, Turner says.

So despite the silence, progress on DEN is being made and activity is expected to pick up once standards become a little more solidified, observers say.

"I still detect a lot of interest in the directory-based approach and the value that it has for administering and controlling information of all kinds," McConnell says. ◪

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# Carriers & ISPs

*The Internet, Extranets, Interexchange and Local Carriers, Wireless, Regulatory Affairs*

## Briefs

**GTE** will waive installation and equipment fees for customers who sign a one-year contract for digital subscriber line (DSL) service, a savings of $60. Through the end of July, GTE is also allowing businesses that order DSL service to cancel within 90 days without any penalties and get their monthly access fees refunded. The moves are designed to stimulate DSL sales and help reach the company's goal of installing 200,000 lines by year-end.

Sprint announced last week that **EarthLink** is the exclusive ISP for Sprint's new Broadband Direct fixed wireless service. Sprint Broadband Direct customers can access EarthLink's Internet access services over high-speed fixed wireless connections from their homes or offices.

Customers will also be able to use EarthLink's nationwide analog dial-up service to access the Internet using a telephone line when they are traveling around the U.S.

Wireless titan Craig McCaw is saving financially strapped **New ICO** (formerly ICO Global Communications) by investing a huge chunk of change in the satellite company. McCaw, along with a group of investors, is pumping $1.2 billion into New ICO, which emerged from Chapter 11 bankruptcy protection earlier this month.

McCaw has also set up a new holding company for the company's satellite assets called ICO-Teledesic Global Limited, which will eventually hold New ICO's satellite assets if regulators and New ICO's directors approve the deal. New ICO is expected to launch satellite voice and data services in 2003.

# AT&T Wireless adding free data option

BY DENISE PAPPALARDO

If you're looking for service plan options for mobile wireless voice and data services, then AT&T Wireless may have something for you.

AT&T Wireless earlier this month launched Digital PocketNet, which offers customers an inexpensive wireless voice and Internet access service bundle.

Digital PocketNet lets customers access AT&T's time-division multiple access voice network and Cellular Digital Packet Data (CDPD) network using one handset.

While this is not the first time AT&T has offered a combined wireless voice and data service, it's the first time that at least one of the data service options is free.

Earlier this year, AT&T launched Enterprise PocketNet service, which offers business customers wireless voice and Internet access, and lets them access corporate applications such as Lotus Notes and Microsoft Exchange with their handset. This service starts at $20 per month for unlimited Internet access and goes up as users add enterprise application access. But AT&T's Digital PocketNet service plans start at no additional charge on top of a customer's voice service plan.

Digital PocketNet will be attractive to users who want to scan headlines on the Web, says Charul Vyas, research analyst at Framingham, Mass., consultancy IDC. Between the slow speeds and small screens, users aren't going to want to do much more when it comes to data on a wireless handset, she says.

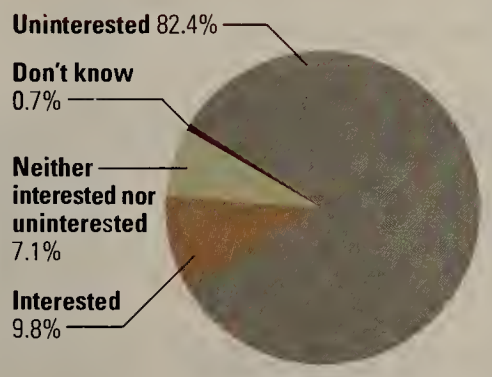
"Just about all of the wireless service providers are talking about upgrading their networks to support higher speeds over the next couple of years," Vyas says. "[Digital PocketNet] is a good way for users to get started without making a big investment before upgrades are available."

See **AT&T**, page 32

### Uphill battle for wireless

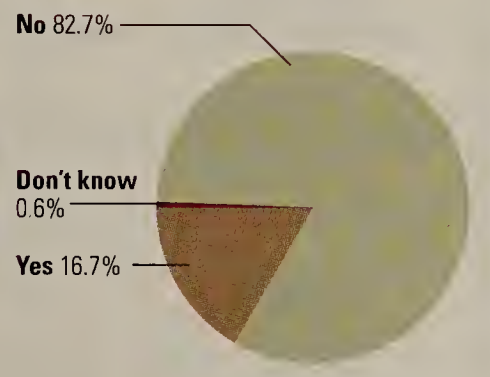
**According to a recent survey, many users are not interested in accessing the Internet using wireless handsets.**

**How interested are you in using a connection to the Internet through your cellular or PCS phone?**




591 respondents with wireless Internet access.

**Do you use a connection to the Internet through your cellular or PCS phone on a regular basis?**




156 respondents with wireless Internet access.

SOURCE: IDC, FRAMINGHAM, MASS.

# TalkingNets makes debut as voice ASP

*Start-up plans to make voice/data services more common via ISPs.*

BY TIM GREENE

*WILMINGTON, N.C.* — A new class of service provider will make it more likely that you can buy voice, data and Internet-access services over the same connection from the same carrier.

Upstart TalkingNets is the first with plans to wholesale packet-voice services to ISPs, making it possible to resell these services to their customers, packaged with Internet access and data links.

While TalkingNets has made parts of its plan public, other newcomers are still in stealth mode and planning to launch services later this year, says Tom Jenkins, an analyst with Boston telecommunications market research firm TeleChoice. ISPs and even data competitive local exchange carriers that don't want to spend time and money on voice gear can sell voice easily using this type of service, he says.

"This idea makes a lot of sense," Jenkins says. He adds that he knows of at least six other voice companies that will announce similar services by year-end, although he was not at liberty to name the companies involved.

TalkingNets is promoting the convergence of voice and data services by making it easy for ISPs to add voice to their existing data portfolios. The company calls itself an application service provider (ASP), with voice being the only application it sells and ISPs as its target customers.

ISPs, in turn, would bundle their current Internet access and other data services with TalkingNets' voice to provide corporate customers with less expensive phone services. TalkingNets says it will wholesale its services to ISPs so they can in turn retail it at 25% less than tradi-

See **TalkingNets**, page 32

### PROFILE: TALKINGNETS

| | |
|---|---|
| **Headquarters:** | Wilmington, N.C. |
| **Founded:** | November 1999 |
| **Service:** | Wholesale packet voice for ISPs |
| **Competitors:** | Competitive local exchange carriers, ISPs |
| **Employees:** | Six |
| **Funding:** | $2.2 million from Venrock Associates, TriTech Partners and the Hatch Group |
| **Fun Fact:** | TalkingNets' business concept diagram was sketched out on a beer coaster at Gordon Biersch in Palo Alto |

**AT&T,**
continued from page 31

Digital PocketNet Basic Plan includes unlimited access to 40 Web sites, including ABC-News.com, BarnesandNoble.com, ESPN.com, MapQuest and Travelocity. Basic Plan users can only surf the 40 Web sites AT&T defines.

AT&T's Digital PocketNet Plus Plan costs $7 per month and offers customers e-mail and faxing along with the Basic Plan features. The Digital PocketNet Premium Plan costs $15 per month and lets users access any site on the Internet, not just the 40 AT&T specifies. But AT&T has set up a filter so that when Premium Plan customers are accessing non-WAP-enabled sites, they will only see text information on their handset screen. They can also access calendar, contact and to-do list applications.

Small screens are one limiting factor to all wireless Internet access services, such as those from Sprint PCS and Verizon Wireless, but Digital PocketNet has other drawbacks. Because AT&T's wireless Internet access service uses CDPD technology, business users do not have nationwide coverage. CDPD does offer users coverage in 3,000 cities.

The service is slow compared with what most users are accustomed to on their desktops. CDPD supports data rates of 19.2K bit/sec, which is actually faster than most other mobile wireless networks that top out at 14.4K bit/sec. Digital PocketNet customers also have to buy an Ericsson R280LX or Mitsubishi MobileAccess T250 wireless phone, which cost $100 and $200, respectively. ◪

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**TalkingNets,**
continued from page 31

tional carriers' retail prices.

In addition, these corporate customers will have just one service provider to deal with, and TalkingNets will make it more likely that an ISP in any given area will have bundles of services to sell, Jenkins says.

TalkingNets' typical minimal end-user configuration would provide a 256K bit/sec data pipe, with part of that bandwidth earmarked for up to 12 channels of voice traffic. The services will be suited for branch sites with up to 12 phone lines. Adding and dropping lines will be easier because they will be carved out of the bandwidth on a single connection to the customer. Such changes can be made without technicians coming to customer sites or stringing more wires.

TalkingNets' plan is to install an integrated access device (IAD) at customer sites. Customers plug their voice and data gear into the IADs and the IADs send the merged traffic on a single connection, either digital subscriber line, frame relay or ATM. The company says it is still evaluating hardware before deciding which to buy. Jenkins says not knowing which gear it will use is a drawback because potential ISP customers will be unable to completely evaluate the services TalkingNets is creating.

At the ISP, the voice traffic will be shunted to a trunk to TalkingNets' network where telephone calls will be processed using software-based local phone switches. Calls destined for customers on the public phone network will be converted from packets to circuit-switched traffic and diverted to traditional local and long-distance carriers.

Calls bound for customers of other upstart packet-voice carriers will remain packets and be switched to those networks.

The voice services will include Centrex features and long-distance.

TalkingNets plans to start introducing services by year-end, with coverage in 25 cities expected by the end of 2001. In the meantime, it is setting up the minimum specifications its ISP customers' networks must meet in order to support the quality of service TalkingNet's voice service requires. ◪

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Eye on the carriers . David Rohde

# MPLS GIVES FRAME RELAY NEW EXTRANET LIFE

Frame relay is a great wide-area technology except for one thing: It doesn't make any sense for 21st century networking.

Let me modify that before the e-mails start flying. The graying founders of the zippy and bursty variable-length packets we call frame relay always knew the technology had one potential drawback: What happens if all the sites on the network wanted to talk to each other?

Twice the frame relay community came up with an answer that didn't pass the market test. First, there was the idea of full meshing: pre-establish a permanent virtual circuit between every pair of sites.

A little math combined with the per-circuit pricing culture of the telecom industry showed why this failed. The number of site pairs grows exponentially as the network sizes up. Did you think carriers were going to give away the extra permanent virtual circuits (PVC)?

The second idea was switched virtual circuits (SVC), basically a standby mapping of all network sites with the promise of charging only for the usage sent by any one site to another. But usage-based billing systems for SVCs have taken forever to mature, and SVCs have been adopted by few carriers.

Perhaps the real issue all along was urgency. The number of frame relay ports rose above one million on the strength of classic terminal-to-host and client/server enterprise networking. Now along comes the IP revolution with the promise of bringing the world onto the network, and companies are thinking of extending what are essentially private networks into the public sphere.

That's why the third time may be the charm for frame relay carriers. First AT&T, and now MCI WorldCom, have launched frame relay services based on Cisco's implementation of the emerging Multi-protocol Label Switching (MPLS) standard in their carrier boxes.

AT&T's IP-Enabled Frame Relay and MCI WorldCom's Business Class IP are based on the idea of requiring each network site to send only a single frame relay PVC into the carrier's ATM network core. From there, the Cisco MPLS software assigns a label to each packet that contains information on what type of closed user group — or virtual private network (VPN) — the packet belongs to. Via IP addressing, the packet can then be sent to any other site on the network.

Among the beauties of this system: Companies can create VPNs for multiple extranets — say, different classes of suppliers or customers. Pure IP VPN security measures are not needed because the network retains the more-inherent security of frame relay and ATM. Router utilization can be optimized because the carrier switch does more of the work. And users get more life out of their existing frame relay implementations.

Sure, this system may be a weird hybrid. It's not a real IP VPN, and not just anyone can dial in, because they'd still need a frame relay interface. But when have corporate networks not been characterized by hybrids? These new services may be just the ticket for a lot of users extending their networks — at least for their next three-year contract.

*Rohde is a senior editor at* Network World. *He can be reached at drohde@nww.com.*


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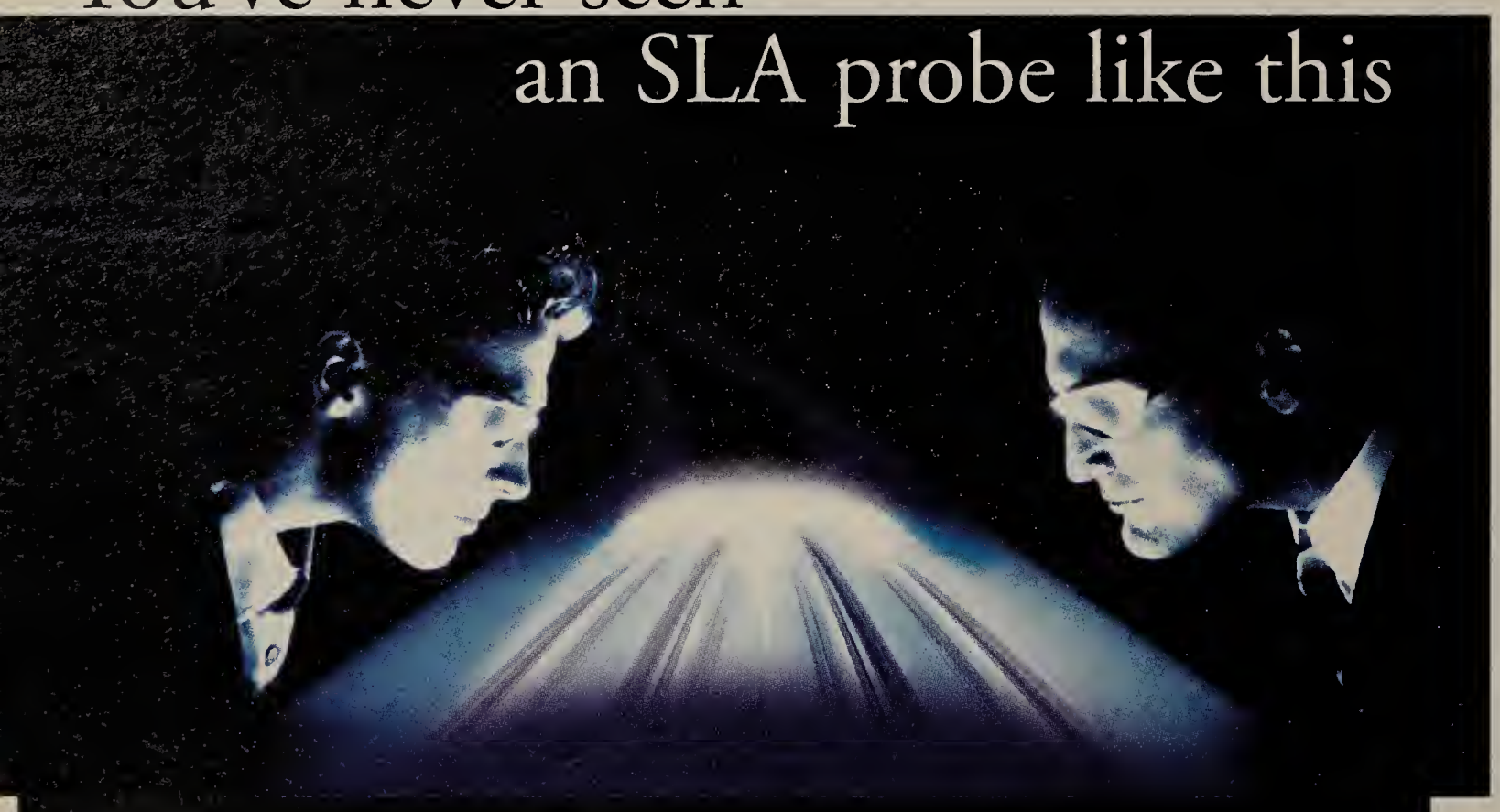

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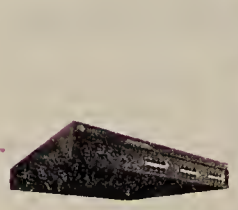

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## Briefs

Enterprise resource planning software provider **J.D. Edwards** last week said it would cut its global workforce by 800 and focus on reinventing itself as an e-business. The layoffs, which will hit the company's operations in Germany and Japan, are an effort by J.D. Edwards to get its costs in line with its revenue, CEO C. Edward McVaney says.

"This is a very tough but very necessary decision," says McVaney, who was reappointed as president and CEO in early April, following the resignation of Doug Massingill.

McVaney was CEO from the company's founding in 1977 until November 1998, and he remains chairman.

**Sun-Netscape Alliance** has announced it will integrate its iPlanet Market Maker application with Open Market's transaction-processing server for Web-based content management. The companies will jointly market the products to online business-to-business sellers.

**Sierra Atlantic**, a Fremont, Calif., Internet professional services firm, has announced three offerings designed to help old-line manufacturing, telecommunications and financial services companies integrate Web-based applications with their legacy systems.

The eRelationship Management offering uses software from Broadbase and Rubric. The Order Management offering is built on BroadVision's platform.

The Collaborative Manufacturing offering employs software from Agile and Oracle. Pricing for each offering starts at $500,000.

Sierra Atlantic: www.sierraatlantic.com

# Start-up hosting supply-chain apps

BY ELLEN MESSMER

*SUNNYVALE, CALIF.* — Start-up Viquity makes its debut this week with a hosted supply-chain application that relies on format-neutral XML to let manufacturers share sales forecasts and place orders directly into a supplier's back-end system.

According to CEO Chris Grejtak, Viquity was founded with an eye on high-tech manufacturers that outsource production of some components. The hosted application service, called The Viquity Dynamic Commerce Network, offers the manufacturer a way to electronically share documents with customers or suppliers in lieu of printing out reports for them or calling to complete a business deal. Instead, customers and suppliers can access the information via a Secure Sockets Layer connection over the Internet using a Web browser at the desktop.

A handful of manufacturers have started using the Viquity service, which costs $5,000 to $30,000 per month, depending on the volume of data the manufacturer transmits to business partners.

For example, Sonic Manufacturing Technologies has used Viquity for almost two months with some of its suppliers, including Arrow Electronics, Avnet and Future Electronics. The Freemont, Calif., manufacturer of circuit board assemblies has set up its enterprise resource planning (ERP) system to transmit forecast data directly to the Viquity Dynamic Commerce Network.

"Viquity goes to my Expandable ERP system and reads the sales forecast, then gives these requirements to my suppliers," says David Ginsberg, vice president of supply-chain management at Sonic.

Once the supplier reviews this data and makes a commitment to supply a certain number of parts, Viquity can convert that

See **Viquity**, page 40

### PROFILE: VIQUITY

**CEO Chris Grejtak**

| | |
|---|---|
| **Headquarters:** | Sunnyvale, Calif. |
| **Founded:** | Sept. 1998 |
| **Product:** | Hosted service for supply-chain document managementbetween manufacturing partners. |
| **Key executives:** | Chris Grejtak, founders Sandevp Jai and Gordon Smith. |
| **Funding:** | $10 million from Hummer Winblad and Atlas Ventures |
| **Employees:** | 50 |
| **Web site:** | www.viquity.com |

# E-commerce management is making strides

*Tools for monitoring Web site performance, e-commerce security being added to platforms.*

BY MARC SONGINI

The leading network and system management vendors are in a race to extend their product lines to manage e-business applications and transactions. While observers are glad to see the vendors moving in this direction, they say the companies need to make up for a slow start and deliver stronger tools in areas such as security.

Aprisma, BMC Software, Computer Associates, Hewlett-Packard and Tivoli are all enabling their products to play better in e-business environments, to meet customer needs and ward off threats from more-focused start-ups.

"The tremendous growth of e-commerce is a driver for us in network management," says Rose DeBruin, solutions manager for HP OpenView. Citing a report from Cambridge, Mass., firm Forrester Research, she says business-to-business transactions will grow from $43 billion in 1998 to $1.3 trillion in 2003.

Tools being added to platforms include those for monitoring Web site performance, managing e-commerce applications and enforcing quality-of-service priorities among Web servers.

CA has been among the most aggressive platform vendors in pursuing the e-commerce management opportunity.

The company recently announced plans to deliver Web portal-based technology for its Unicenter TNG platform. The technology will let employees whose jobs depend on Web-based systems get different views of the network depending on the nature of their job. A net manager, for instance, would get more detailed information than a CEO or customer service representative.

CA is complementing Unicenter with several other technologies that can also help companies running e-commerce sites. CA's Jasmineii software can be used to link Web storefronts to back-end data sources and can serve as a Web portal or application server, among other things. Jasmineii also works with CA's Neugent technology, which can be used to customize Web pages for individual users as well as predict potential failures in e-commerce servers and networks.

Users such as Scott Henry, a network systems manager at PC ServiceSource in Dallas, is pleased that CA is making strides in e-commerce management. But he says CA and other vendors have plenty of work to do in areas of protecting customers' nets from viruses and denial-of-service attacks.

Henry, who uses Unicenter to manage the company's Windows NT- and HP-UX-based net, says nearly one-third of his company's revenue is derived from online sales, so the ability to make sure the firm's eight Web servers are up and running is crucial, especially at night when the staff is absent.

Henry uses CA's Unicenter Web Management Option to monitor the

See **Platforms**, page 40

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# Blueflame lights fire under Web performance

*A diamond in the rough, Fireclick's Blueflame software improves Web performance.*

BY DENNIS WILLIAMS, NETWORK WORLD TEST ALLIANCE

In the pursuit to improve the "Web experience" comes Fireclick Blueflame 1.0, a software-based Web performance enhancement utility designed to improve user performance by utilizing the clients' and the Web server's existing unused bandwidth potential.

Blueflame, which sits next to the Web server on a host's network, improves performance by being proactive in downloading content to a user's browser. Rather than waiting for the user to click on the next logical link, Blueflame preloads content to the browser's cache while the user is reading the current page. So when the user clicks on the next link, the page elements come from the browser's cache where Blueflame has already loaded them, not from across the Web.

This means increased customer satisfaction, fewer abandoned shopping carts and prolonged browsing sessions for Web site owners and e-commerce shops — all the things your Web site relies on to generate revenue.

Blueflame is a reverse proxy server that accelerates the end users' Web experience. It performs a real-time, click-stream analysis of the predominant usage paths on a Web server to determine which elements to download to the users' cache.

This is done by understanding usage paths on an element-by-element basis. Blueflame doesn't need to predict what page a user will go to. If there are 14 possible links on a page and 10 of those have the same logo or picture, the software will download that image because the user will likely need it regardless of which page he selects.

Blueflame uses the available bandwidth on the client side, in addition to the unused bandwidth and server-side resources of the Web server, to accelerate the end-user experience. Web site managers appropriate bandwidth for peak traffic, but because a Web site is typically running at 20% to 40% of capacity in a normal scenario, you're likely to hit those peaks only once or twice a day.

Blueflame uses the available bandwidth that companies are already paying for to predownload content to users. As peak traffic times arise, Blueflame will reduce the amount of predownloading it does. And as peaks subside, it will more aggressively predownload content. This is configured through the Blueflame Web-based configuration applet.

### Implementing Blueflame

Fireclick recommends that Blueflame run on a dedicated Windows NT or Sun Microsystems Solaris machine. We placed our Blueflame server behind a Cisco LocalDirector load balancer. The load balancer directs Web traffic to the Blueflame server. In the event of a Blueflame server failure, the LocalDirector would redirect the traffic to the live Web site. This is the fail-safe configuration, but a redirector is not required.

Because Blueflame is a proxy server, it is separate from the Web server. This lets it support every Web server available. The size, speed and capacity of the server used to run Blueflame is dependent on the number of pages accelerated.

On the user side, the only thing a user notices is an increase in speed for Blueflame-accelerated Web sites. The client component is a small, transparent Java applet. Users must have Java enabled on their browser to take advantage of Blueflame acceleration. Users without a Java-enabled browser will still be able to see Blueflame accelerated sites, but at normal speed.

We found Blueflame to be a little rough around the edges especially in the areas of configuration and management. We called technical support after installing the product because we thought it had hung the NT server. It turned out to be working fine — there just wasn't any acknowledgement of whether the Blueflame engine applications were alive.

Blueflame includes two console applications that launch the product, both of which must be started individually. These applications start up as DOS boxes on the NT server and offer little meaningful information to administrators. A third configuration application must be launched to enable the Web-based configuration applet, which then displays traffic activity on your site, along with display and read times.

However, we found it difficult to translate the numbers into meaningful results. After any configuration change, we had to manually terminate the DOS boxes so we could shut down Blueflame, then restart each one individually from the Blueflame menu.

Despite the rough edges, we consider Blueflame a gem because it gets the acceleration job done. We set up the product in about 30 minutes, accelerating a test Web site and gathering statistics.

Because Blueflame learns about user patterns over time and becomes more efficient, the more traffic the site gets, the faster it learns about the predominant paths. During the course of one week, we tested the performance gains offered by Blueflame on our test site and noted a gradual increase.

One page took 15 seconds to complete on the first attempt and about seven seconds after a week's time. Different pages experienced different levels of acccleration in our tests, with a total average performance increase of 42% over the one-week period. Your results will vary depending on such things as content, usage and available bandwidth.

Will Blueflame's technology improve the Web experience for your Web site users? Definitely yes. The use of cache for memory, processor and hard drive performance enhancement is a long-proven technology, so applying a similar technology to Web site performance makes a lot of sense.

Will it make your Web business more profitable? If end-user performance is the hurdle you need to gain profitability, Blueflame provides an excellent answer.

*Williams is a freelance writer and product improvement consultant in Alpine, Utah. He can be reached at Dennis@ProductReviews.com.*

## NetResults

### Blueflame 1.0

**RATING: 8.3** **COMPANY:** Fireclick, (650) 917 7600, www.fireclick.com **COST:** Fee based on page hits, starting at $2,250 for up to five million hits per month. **PROS:** Supports all major Web servers; improves Web based performance for all Java enabled clients. **CONS:** Difficult to measure benefit due to lack of management and reporting capabilities; interface needs improvement.

| Server support 25% | Client support 25% | Performance 20% | Management 15% | Ease of use 5% | Installation 5% | Documentation 5% | Total score |
|---|---|---|---|---|---|---|---|
| 10 | 10 | 8 | 5 | 7 | 8 | 4 | 8.30 |

**Individual category scores** are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

## How We Did It

We tested the first release of Blueflame 1.0 by installing it on a Dell PowerEdge 2200 dual Pentium II 266-MHz server running Windows NT 4.0 Server with Service Pack 6a. We configured Blueflame to accelerate several Web server scenarios. We used Blueflame to accelerate Microsoft's Internet Information Server (IIS) running on the same server as Blueflame.

Next, we accelerated an IIS running on another NT server on the network. Finally, we accelerated an Apache Web server running across the network. However, we only ran benchmarks on the Web server on the same LAN because this is the recommended, most beneficial and most common implementation method.

We timed how long it took a Windows 98/2e workstation running Internet Explorer 5.0 using a dial-up 28.8K bit/sec modem connection as a common standard connection to the Internet to load a variety of sample Web pages. The Web pages ranged in complexity from very simple text-based pages to ones containing large graphics and Java scripts. We tested the performance of the product during a seven-day period.

*Williams is also a member of the Network World Test Alliance, a cooperative of the premier reviewers in the network industry, each bringing to bear years of practical experience on every review. For more Test Alliance information, including what it takes to become a member, go to www.nwfusion.com/alliance.*

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**Viquity,**
continued from page 37

information into a purchase order and put it back into the Sonic ERP system, Ginsberg says.

As part of its service, Viquity supplies "adapter" software used to convert from proprietary ERP formats, such as SAP, Baan or Expandable, to Viquity's XML format. In Sonic's case, the XML adapter sits on a Windows NT server in front of the manufacturer's ERP system.

There have been few hosted manufacturing supply-chain applications, with i2 Technologies among the few to compete with Viquity so far. Manufacturers have shared information using electronic data interchange, but Ginsberg says he has refused to install EDI systems because of their high cost.

"It's extraordinarily expensive and outdated technology, which costs in excess of six figures to implement," Ginsberg says. Viquity, though, is providing Sonic with an alternative to phone, fax or e-mail to complete business deals.

Viquity: www.viquity.com

**Platforms,**
continued from page 37

availability of his company's Web pages. Before this, he had nothing to tell him what his customers' experiences were like when downloading Web pages. CA's product also lets him know if someone has altered content on the company's Web site, he says.

BMC, meanwhile, offers Patrol for E-business Management, a product that lets information systems staff monitor firewalls, Web transactions and even specific products such as Microsoft's Site Server Commerce Edition. BMC added a feature to its Patrol 2000 flagship product that will do root-cause analysis in failed Web devices or applications.

The company recently bought Evity, which offers a service for measuring Web site performance. The service, dubbed SiteAngel, simulates transactions, such as the purchase of a book, and measures the performance time for each step of the process. If the Web site malfunctions, IS staff will be notified.

For its part, HP offers VantagePoint Internet Services software to let companies manage both their Web servers, whether they are accessible internally or externally. The software measures availability and response time of such servers and feeds the results to HP OpenView Network Node. The software can also be used by IS staff to set and enforce network resource priorities.

Another competitor, Tivoli, has announced an e-business heavy edition of NetView, its network management software. Included in Version 6.0 is SmartSets, software for defining different classes of devices or applications — for instance, routers carrying key e-business traffic across a WAN — and writing rules that only apply to them.

In the same vein, Aprisma's new Spectrum 6.0 is geared to help IS staff prioritize key e-business applications and devices. Among other features, Spectrum now has artificial intelligence to model the effects of a Web server crash and help determine what parts of the network must receive priority attention.◪

## E-comm management platforms?

**Some network management system vendors are remarketing their software to enterprises as a platform for managing e-commerce operations. The trend could be viewed as a strategy to stay afloat in a market that analysts predict will shrink over the next several years.**

**Worldwide enterprise network management revenue** (in billions)

SOURCE: IDC, FRAMINGHAM, MASS.

# ERP-to-Web software upgrade on the way

*Impress Software also ready to launch its U.S. operations.*

BY CAROLYN DUFFY MARSAN

German firm Impress Software will host a coming out party in June, with a formal launch of its U.S. operations and a new version of its software, which provides a Web interface to popular enterprise resource planning (ERP) applications from SAP, PeopleSoft and Oracle.

Founded three years ago, Impress has already attracted an impressive roster of U.S. customers, including Compaq, Coca-Cola and Wolverine World Wide. Most of these companies use the Impress Online Information System (OIS) to give customers and business partners access to their SAP manufacturing systems over the Internet.

The fact that Impress OIS works directly with SAP R/3 is what attracted Wolverine, the Rockford, Mich., footwear manufacturer. Mike Pfennig, senior director of information systems at Wolverine, says Impress was the only company he could find that had already built and deployed a Web interface to SAP's Apparel and Footwear system.

SAP's rival solution, dubbed MySAP for Footwear, is not yet available. "It's at least two years down the road," Pfennig says.

When Impress OIS is deployed by Wolverine in July, the firm's dealers will be able to log on to one of the company's Web sites and place orders. They'll also be able to view up-to-the-minute product availability, order status and account information. Until now, Wolverine's dealers had to phone or fax orders.

Impress is providing its OIS software as well as the half-dozen people required to deploy the system for Wolverine.

Impress is introducing Version 2.5 of its software, which features an easier to use interface, speedier processing of large volumes of data and support for Linux. Other improvements include extended support for XML and electronic data interchange, redesigned back-end interfaces, and improved error and message handling.

OIS is application server software written in Java with its own database. It has four components:

- OIS/Agent, an online transaction tool that automates interaction with customers and feeds ERP systems.
- OIS/High Availability, which provides multiple redundant application servers and databases for reliability.
- OIS/Backpack, which lets users transact business even if the ERP system goes down.
- OIS/Mobile for disconnected client access.

Impress OIS sells for around $250,000 and is available as a software license or as a hosted service through third parties.

Impress: www.impress.com

## PROFILE: IMPRESS SOFTWARE

| | |
|---|---|
| **Headquarters:** | Burlington, Mass., and Hannover, Germany |
| **Founded:** | 1997 |
| **Product:** | Impress Online Information System, software that Web-enables enterprise resource planning and legacy systems. |
| **Funding:** | $24 million in two rounds of venture financing |
| **CEO:** | Marc-Achim Elmhorst |
| **Employees:** | 157 |
| **Web site:** | www.impress.com |


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'Net Insider . Scott Bradner

# THE PRICE OF KIDS

A cover story in this paper two weeks ago seemed to lament the reportedly high cost of complying with the Children's Online Privacy Protection Act (COPPA). It was not a bad article, but I think it gave short shrift to a basic point.

*The New York Times* reported on May 19 that the Federal Trade Commission had gotten fed up with the abysmal record that major Web sites have compiled on the privacy of Internet users. The official administration position has been that the industry should police itself except in the one area of protecting the privacy of children who use the Internet.

Until now the FTC has gone along. But reality finally seems to have sunk in, and the FTC has belatedly realized that depending on the ability of companies like RealNetworks and DoubleClick to understand the concept of privacy was a pipe dream at best.

COPPA is about the only example in the U.S. of someone in authority being provably concerned with the invasions of privacy that are rampant on the Internet. It established that young kids are not mature enough to understand when they are being exploited and that parents need to be in the loop. It sure was insightful of Congress to figure this out.

COPPA was passed in 1998, but the detailed requirements were only released late last year. Still, the basic facts have been known for quite a while and Web site designers should have been coding to meet them.

Yet it looks from the article that much of the work to make the sites compliant was done in the last few months. I cannot tell for sure as it is so hard to find factual information from the Web sites, but it even looks like one of the sites featured in the article came online after the law was passed and two others are only 4 years old. I imagine that all of them have significantly reworked their sites within the past two years. They had ample opportunity to fix their software. But it is telling that they did not factor in parental consent from the beginning even without the law. It seems the law was needed.

The other place that the article came up short in my mind is that it focused on the cost of compliance and failed to emphasize the reason for the legislation in the first place. Zeeks.com spent $150,000 to get ready for the law. What price should be placed on a child's development? On a per-kid basis, what did this cost? Peanuts at most!

A number of the columnists in this publication have written repeatedly about the seemingly endless assaults on privacy that Internet users are faced with every day. I would like to have seen a better recognition of progress in an article about the first glimmer of a clue on the part of this government.

Disclaimer: Clue and Harvard is a logical pairing, but the university has not expressed an opinion on the above topic, so this rant is mine.

*Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@sobco.com.*

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# XML consolidation begins as Vignette, WebMethods make billion-dollar buys

BY ELLEN MESSMER

Last week brought the start of industry consolidation among the software vendors pioneering the use of XML, as WebMethods said it would buy Active Software and Vignette announced it would acquire OnDisplay.

WebMethods in Fairfax, Va., intends to buy Active Software, located in Santa Clara, for $1.3 billion in an all-stock deal. And the Austin, Texas, company Vignette signed an agreement to acquire OnDisplay in San Ramon, Calif., for about $1.8 billion in a stock swap.

WebMethods, which lost about $18 million last year on revenue of $23 million, makes a business-to-business server that enables XML-based storage and the exchange of business documents, such as orders and shipment information, between trading partners.

XML is the format-neutral document tagging structure developed by the World Wide Web Consortium. It is the primary technology for translating and storing documents that may have originated in different formats, such as the proprietary SAP and Baan formats, or the older e-commerce standard called Electronic Data Interchange.

WebMethods CEO Phillip Merrick says that acquiring Active Software, which markets the ActiveWorks Integration System for automating end-to-end business processes, strengthens WebMethods' ability to help corporations integrate their back-end systems for e-commerce purposes. The two firms already have some customers such as Federal Express in common.

"We're now the clear market leader in this business-integration space," he claims. However, Wall Street, in volatile trading, sent WebMethods' stock down 17% to $72 last Monday. Active's stock dropped 3% to about $32 at the close of trading last Monday.

Once the WebMethods acquisition of Active Software is completed, WebMethods will have about 600 employees and offices on both U.S. coasts.

In yet another XML blockbuster deal announced the same day, Vignette, which markets the V/5 platform for XML-based document management and publishing, said it would buy OnDisplay, which sells the XML-based repository, CenterStage. The combination will make Vignette a company of 2,000 employees and 870 customers.

Greg Peters, CEO at Vignette, and Mark Pine, CEO of OnDisplay, were busy proclaiming the wisdom of the merger of the two companies this week. "Together with Vignette, we now provide the industry's only true end-to-end solution," Pine said. ◪

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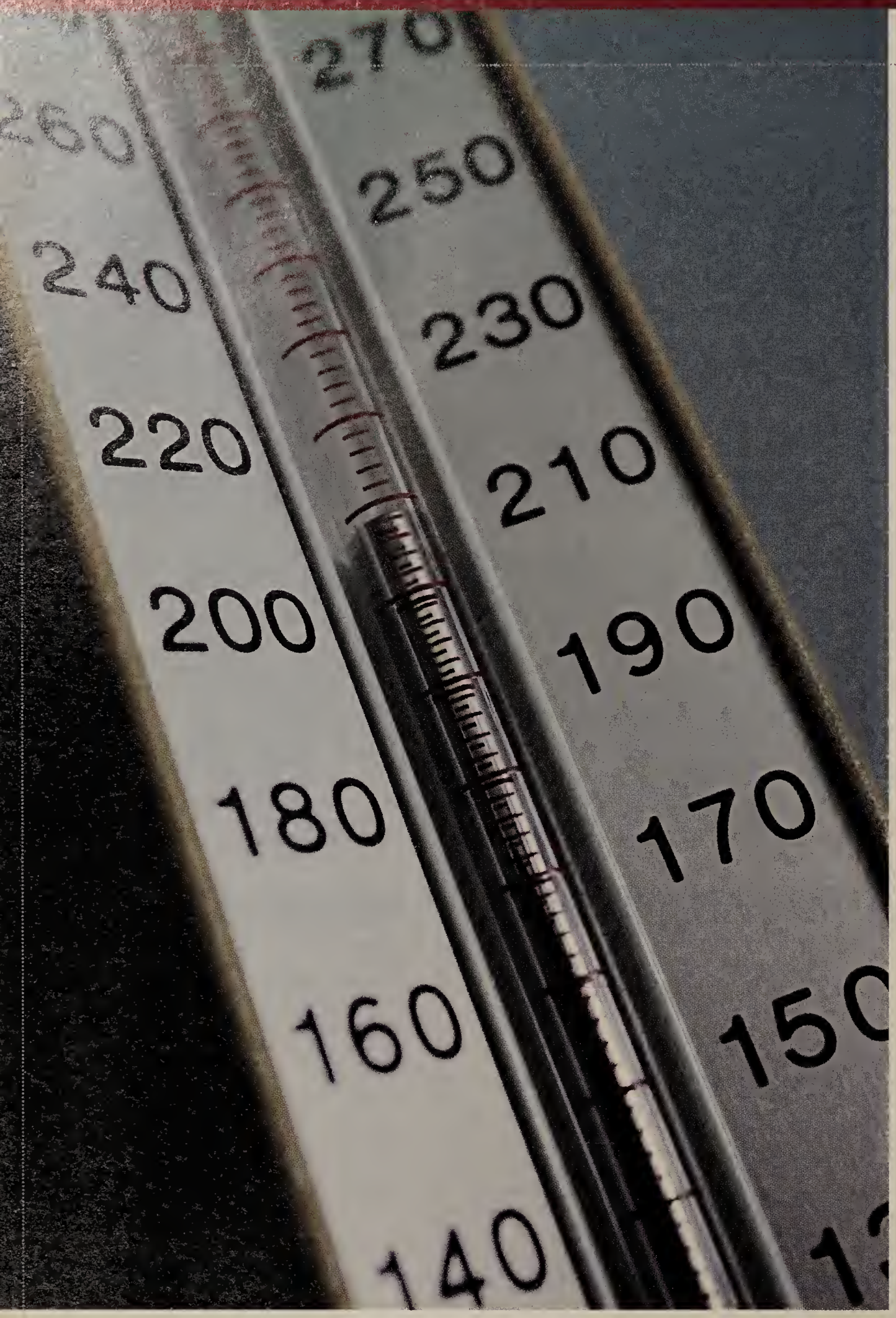


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# Technology Update

**An Inside Look at the Technologies and Standards Shaping Your Network**

## Ask Dr. Intranet

*By Steve Blass*

**We are linking our company to the Internet, and we are discussing the placement of the firewall. I feel that the firewall should reside in-house for the best security; others want to put the firewall at our ISP and run a point-to-point T-1 between us. Although the risk is small, I think there is a risk of having an unprotected circuit between us and the firewall. Am I off-base?**

My approach to firewall placement is to have one at the Internet boundary and another at the boundary between your Internet services network (sometimes called the DMZ) and your enterprise network. There are some good reasons to let your ISP handle the firewall at the Internet boundary, especially if they will monitor and manage that firewall for you.

I still recommend firewalling your enterprise network from your ISP with an internally controlled firewall. This "belt and suspenders" approach lets you control your network traffic while off-loading the basics to the ISP. You can verify that the ISP firewall is performing by monitoring your own firewall logs, and you can immediately test new policy rules on your firewall before having your ISP implement them on the other firewall. In today's Internet, two firewalls, one placed at each end of your DMZ, are better than one. Two other network protection systems to consider are e-mail virus scanning at the gateway and intrusion detection systems.

*Blass is a network architect at Sprint Paranet in Houston. He can be reached at dr.intranet@paranet.com.*

# Service discovery spans platforms

BY ROBERT A. PASCOE

Wireless technologies allow a device to enter and leave multiple networks at will. The concept of a personal area network will let users be connected to information services anywhere through their personal communicators and wearable computers. For these technologies to be useful, however, they must be very easy to use.

In addition, such networks must be self-configuring, rendering them virtually transparent to consumers. Connections must work out of the box, without setup wizards, online settings or manuals.

The key to making these networks work is service discovery middleware. And to make the job easier, the Salutation Architecture was created to help solve the problems of service discovery and utilization among a broad set of appliances and equipment, and in an environment of widespread connectivity and mobility.

The architecture provides a standard method for applications, services and devices to describe and advertise their capabilities to other applications, services and devices, as well as to discover the capabilities of those other entities.

The architecture also helps applications, services and devices search other applications, services or devices for particular capabilities, and request and establish interoperable sessions to utilize those capabilities. Given the diverse nature of target appliances and equipment in an environment of widespread connectivity, the Salutation Architecture is processor, operating system, and communication protocol independent. It also allows for scalable implementations, even in very small, resource-constrained devices.

Service discovery lets two disparate devices communicate their functional capabilities to one another. Information servers may customize interactions with devices to meet capabilities such as screen size and resolution. Or a service may search for a device that meets specific processing requirements such as document finishing. A device may also search a network to locate needed services.

To be successful, service discovery technology must provide more than the ability to advertise a device's class or a service's functionality. It is no longer enough to discover a printer. It is necessary to know a printer's color capability, the various resolutions it supports, the availability of a document finisher and collator, and the contents of the input drawers.

In traditional networks, a central directory contains detailed records about the network elements. In less-formal networks, a surrogate directory or look-up table may be constructed, with one node acting as the repository for the capabilities of the devices and services in a temporary network. Ad hoc, peer-to-peer networks don't require a directory at all, relying on direct interactions to determine the capabilities of other devices. In all of these cases, service discovery is used to identify the capabilities of things that enter the network.

With the wireless, mobile paradigm, the same device may take part in all three of these network types. A single service discovery technology is needed to support the mobile device as it migrates from traditional directory-centric and peer-to-peer networks and back again. Not only should the service discovery technology have the ability to determine the capabilities of the devices that enter a network, they should also have the ability to find a specific device or service and bind to it.

Finally, service discovery technology must be independent of operating systems and protocols. If not, islands of interconnectivity will be created without the means to bridge from one to another. For example, Sun's service discovery technology, called Jini, does not interact with Universal Plug and Play, Microsoft's offering.

The Salutation Architecture has implementations modeled in TCP/IP, InfraRed Data Association standards, Bluetooth and Service Location Protocol. It is available free through the Salutation Consortium, a non-profit corporation. The architecture supports Windows, WindowsCE, Java, VXWorks and Tornado, with ports to Palm in the works.

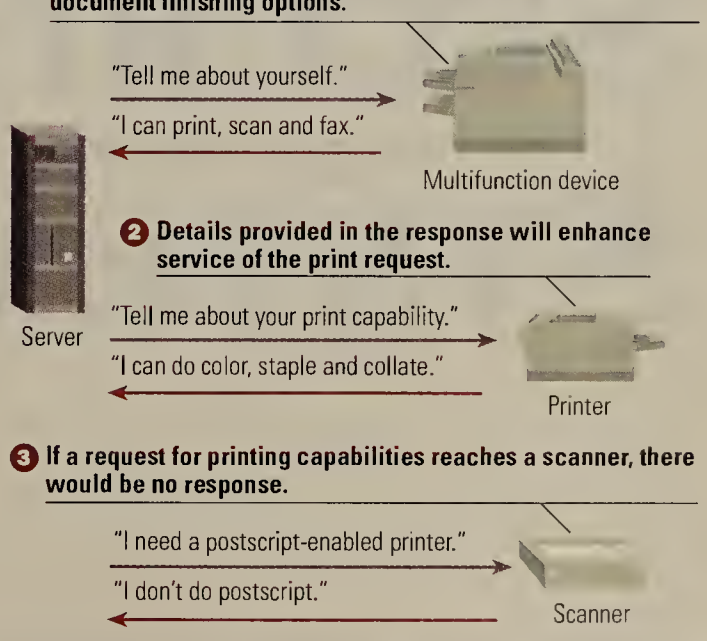
While Salutation-enabled products are shipping in support of office automation, the technology is equally suited to meet the diverse product mix and network requirements presented in wireless networking.

*Pascoe, president of the Salutation Consortium, currently works for IBM. He is also founder of XtraWorX based in Highland, Utah. He can be reached at rpascoe@salutation.org.*

## UP CLOSE

### Three basic discovery options

**Whether applied to office-automation or handheld computing networks, service discovery information such as that provided through the Salutation Architecture needs to be presented at various levels of detail. For example, a print server might say, "Tell me all about yourself" to networked devices and services and receive this information in return:**



Gearhead — inside the network machine . Mark Gibbs

# MASS STORAGE FOR THE MASSES

Gearhead gives up! After struggling for weeks to write a follow-up column to "Sound tricks for digital music" (*NW*, May 1, page 56), this week Gearhead went to the main workhorse PC only to find a trashed system (Gearhead fears hard disk problems). Notes, sound samples, software . . . all inaccessible until we figure out what is the matter.

So this week, with storage on our minds, we'll look at one of the key technologies in the world of hard disk storage: The Small Computer Systems Interface, or SCSI (pronounced somewhat unfortunately as "skuzzy").

Now there are a number of misunderstandings about SCSI. First, SCSI is not a disk interface but a systems-level interface. The difference between the two is that a disk interface like Integrated Drive Electronics (IDE) is for (guess what?) disks. SCSI is far more general. It can be used for all sorts of devices such as scanners, tape drives, CD-R/RW drives and anything that needs a high-bandwidth interface.

And SCSI is fast. The standard eight-bit SCSI has a transfer rate of 5M bytes/sec (note that is "bytes" per second) while 16-bit wide Ultra-SCSI, referred to as fast and wide, raises the stakes to 40M bytes/sec. Although these are the target rates, they are not always achieved because the implementation of a drive and the speed of the PC and its system bus may become bottlenecks (use PCI, EISA or other fast bus for maximum data transfer speeds).

While SCSI might not always have the fastest throughput, it does support overlapped, multitasking I/O (IDE, for example, does not multitask).

The SCSI interface connects the PC bus to the SCSI bus. A single bus can support up to eight physical devices or units (some newer products allow for up to 15 units), and a PC can host up to four SCSI adapters. Each unit is assigned an ID and the actual PC interface is one of the IDs. Thus, a PC with four SCSI interfaces can identify a total of 32 IDs, which translates into 28 devices.

A "SCSI drive" consists of not only the actual disk drive (usually an IDE drive), but also a built-in controller and a SCSI adapter, which makes it an embedded SCSI drive.

SCSI is defined by a number of standards: An ANSI standard (X3.131-1986), SCSI-2 (approved in 1994) and SCSI-3 — which is still in development although SCSI-3 products are already available. Check out T10, a Technical Committee of the National Committee on Information Technology Standards (NCITS, pronounced "insights") which is accredited by ANSI at www.t10.org.

Make no mistake, SCSI standards are complex, serious engineering, which is why you may have had lots of "fun" trying to get SCSI products to work in real systems.

For a tremendous survey of SCSI products, check out the SCSI Trade Association's list at www.scsita.org/cgi-bin/productsearch.cgi.

Finally, Gearhead highly recommends a marvelous tome if you have to deal with the likes of SCSI drives and their configuration. The book is *PC Hardware Library Volume 1* by Scott Mueller.

*Interface with Gearhead at gh@gibbs.com.*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# Opinions

Editorial

## Where the enterprise and carrier nets meet

For years, industry leaders and corporate net professionals have complained that one area has lagged behind the amazing advances in enterprise communications.

The problem? The bottleneck at the edge of the public carrier network. Applications that fly across LANs and cruise across national broadband carrier backbones congeal and even seize up where enterprises meet shared public networks.

Now all that is threatening to change. Next Monday, we are introducing The Edge — a resource devoted to the advances in service-provider networks that are shaking up the old telecom order.

In classic *Network World* fashion, we're going to focus on the hardware, software and services coming to market — but this time from the vendors targeting legacy carriers, new alternative local carriers, ISPs and application service providers.

In The Edge, we'll continue our coverage of new classes of high-speed switches and routers that carriers and ISPs are buying. We'll expand coverage of the new "softswitches" that big-name network vendors and start-ups are offering carriers for IP data and voice architectures. We'll delve deeper into optical network equipment, which could dramatically reduce the cost of metropolitan- and wide-area networking.

We'll also examine terminal equipment for the broadband local-loop trifecta of digital subscriber line, cable modems and fixed-wireless services.

Look for The Edge in the June 5 issue and then monthly thereafter for now. We'll also launch an Edge Web area on Network World Fusion. In print, we'll examine new carrier products from the standpoint of what they mean to you. For example, can new gear really enable service providers to make native high-speed Ethernet an alternative to ATM carrier backbones? On the Web, we'll add news flashes, research topics and an online community for service providers.

Several of our senior editors who write about carrier-class products will contribute to The Edge. After 6½ years covering enterprise carrier services, I'll be managing editor of The Edge and pen a weekly newsletter on the service-provider market. I'm also continuing my current column, "Eye on the Carriers," and will still keep tabs on telecom services around the country.

I look forward to your comments. Drop me a note at drohde@nww.com.

— David Rohde
Senior editor
*drohde@nww.com*

Message Queue

### GIVE IT AWAY

Novell's new NetWare ABEND Analysis System allows users to upload a file from an abended server and, in seconds, have an answer as to what is wrong and some possible fixes ("Novell touts online server fix," April 24, page 9). Novell has yet to disclose whether it will charge for this service. By offering this service for free, Novell could not only achieve its own goals, but also help out us die-hard Novell fans.

Over the past few years, the industry has been moving toward Microsoft products at the server. Novell needs to add value to its operating system to retain market share. One way to do this would be for Novell to offer the ABEND Analysis System free to current and future Certified Novell Administrators and Certified Novell Engineers. This would benefit both parties by adding value to NetWare and help those who have supported Novell all these years.

*Brian Serafini*
*Netware administrator*
*Kentucky Cancer Registry*
*Lexington, Ky.*

### ENDANGERED SPECIES

Your review "Freedom from IP address overload" (May 1, page 67) states: "Because no one could think of a good reason for using them, most companies have abandoned the assignment of locally administered network adapter addresses."

I work for the County of Monterey, installing and maintaining network hubs and troubleshooting network problems for 2,000 to 3,000 network nodes. I manage the assignment of IP and locally administered addresses (LAA). We have not abandoned the practice of using LAAs because they are invaluable for troubleshooting network problems.

More than 80% of our networks are token ring. I would guess the primary reason most people have stopped using LAAs is that most Ethernet/10Base-T card drivers are not written to accept one.

So we do have a good reason for using LAAs. I'm just afraid we won't have that ability much longer, and that's a darn shame.

*Rich Gierman*
*Salinas, Calif.*

### HEAVY METTLE

Regarding Mark Gibbs' "Backspin" column "Testing Metallica's mettle," (May 1, page 105):

I do agree that Metallica's naming universities as co-defendants in Napster lawsuits is a stretch. But certainly Gibbs can understand the problem that exists when one party (Napster) gives away a product, while the party that owns the product (the musicians) are charging for their work.

The suit also has brought attention to users who are setting up music servers on equipment that they do not own. At my company, we found that people were using up our digital subscriber line bandwidth to download music at the company's expense — which generated an even bigger problem because we were now hosting music that was potentially being pirated. As soon as we were alerted to this situation, we shut down Napster access. Not only is Napster a thorn to musicians, but also to all companies that have some kind of dedicated bandwidth.

*Eric Langer*
*Network administrator*
*Team Services*
*Itasca, Ill.*

Why is it "idiotic" to expect to get paid for your work? If people could somehow get you to work for them without paying you, wouldn't you stand up for your rights?

The concept of Napster is great as long as it features work by individuals who have allowed their material to be traded without recompense. I haven't read anywhere that Napster is trying to eliminate the violations against artists or record companies, so why shouldn't the whole thing be shut down?

It's funny that Gibbs can support the rights of universities and companies to protect their bandwidth, but not the right of musicians to get paid.

*Andrew Hambleton*
*Disc jockey*
*CFBU 103.7*
*St. Catharines, Ontario*

*Send letters to nwnews@nww.com or John Dix, editor in chief, Network World, 118 Turnpike Road, Southborough, MA 01772. Please include phone number and address for verification.*


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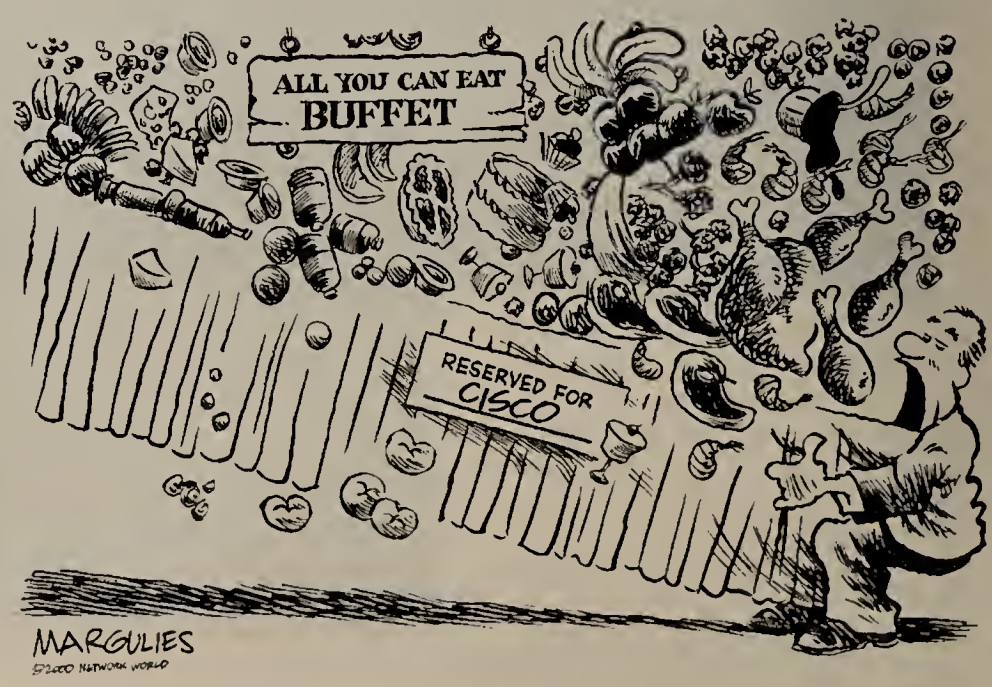

Intranet Adviser . Daniel Blum

# DIFFERENT STROKES FOR DIFFERENT DIRECTORY SERVERS

Directories aren't half as interesting as the applications you can build on them. But when shopping for applications, the key is to get the compatibility and ease of use you expect.

Many types of directory-enabled applications are emerging. There are new economy applications such as iPlanet's Directory Portal that rely on the Lightweight Directory Access Protocol (LDAP) and XML to personalize portals. LDAP is a staple among application service providers supporting e-mail outsourcing or Web-based services. There are old economy applications, such as asset management and marketing communications, requiring access to demographic identity information on corporate users. There are "any economy" applications, requiring scalable user authentication and identification.

Other applications manage the directory or use the directory to manage desktops, policies and enterprise resources. Process Software uses LDAP as a key element of its IP address management solutions. Xylan recently announced it will put policies fetched from LDAP directories into switches. There are middleware applications, such as Radiant Logic's RadiantOne, that use LDAP to navigate information across multiple databases.

When vendors use the directory for desktop management, it becomes the soul of the machine. Novell's ZENworks and Microsoft Windows 2000 Group Policy control the appearance of desktops and arbitrate accessibility of applications and file shares to users.

But while the crop of LDAP-enabled applications is burgeoning, problems lie below the surface. As its name implies, LDAP is just a protocol, not a directory.

Behind its LDAP veneer, a directory server has different event notification, access control services, replication, information schema and other features. For example, iPlanet Directory Server, which has most of the installed base in LDAP-enabled applications, models a directory entry for a person using the almost-standard object class "inetOrgPerson"; Active Directory uses the object class "User." Applications often must tweak the LDAP protocol for the audience.

Developers making advanced use of the directory have a choice: integrate with many directories or integrate tightly with a few directories. Oblix, a directory administration vendor, tries to do it all by writing its own access control on top of multiple directories. This allows Oblix to build strong directory administration tools, but customers must then maintain two access control systems — one for Oblix and another for the underlying directory server.

Clever developers will work around these problems using coding techniques that abstract differences between directories. But not all applications support all directory servers equally well, and every new release leaves developers and customers scrambling.

Directory servers are all different animals. Make sure your vendors are committed to the long-term care and feeding of your strategic directory servers.

*Blum is senior vice president and principal consultant with The Burton Group, an IT advisory service. He can be reached at dblum@tbg.com.*

On Security . Winn Schwartau

# COMMONPLACE COMPLACENCE: IT'S ALWAYS SOMETHING

Gilda Radner's renowned "Saturday Night Live" character Roseanne Rosannadanna ended each of her weekly ranting editorial commentaries with, "Ya know, Jane; It's always something." And, as the past few months have proven, the same can be said about security: It's always something.

The February distributed denial-of-service attacks against leading e-commerce sites were unprecedented. Suddenly, an apparent army of attacking IP addresses were targeting benign Web sites with a vengeance. But was distributed denial of service really new? No.

The government had been experiencing similar lowland scanning attacks for a few years. Instead of a single IP-range scan, limited portions of an IP range were scanned in small chunks. Because each of these scans didn't meet a known wide-range detection mechanism, they went undetected.

In the February distributed denial-of-service attacks, the same approach was taken: distribute the source of attack to many locations in an attempt to disguise what was happening as well as make it difficult to identify the perpetrators. The bad guy in this case (allegedly Canadian 15-year-old Mafiaboy) used so-called Zombie machines to multiply the number of seeming attackers.

Could the military knowledge of lowland attacks have prevented the distributed denial-of-service attacks? Perhaps, but not likely.

Then earlier this month we had the ILOVEYOU virus. It corrupted some files, grabbed names from address books and then clogged the information highways. I don't know if the alleged $80 billion in damage is real, but I was at a financial client site when the virus hit and they were, for all intents and purposes, unaffected. Sure, the client upgraded its virus protection sig files in minutes, and it notified everyone to be on the lookout, but the client's day was uneventful while chaos reigned across hundreds of thousands of servers and mail networks everywhere.

And this is where Radner's prescient brilliance comes into play: It's always something. For example:

- "Mr. Customer, if you buy our whiz-bang firewall, your security woes are over." (Until you discover your network is running 25 secret modems on PCAnywhere or the code to crack your firewall is posted on the Internet.)
- "Mr. Customer, if you buy our virus-detection package, your worries will be over." (Unless you are one of the millions of users affected by the ILOVEYOU virus. Classic virus detection is good for what you know, not for what you don't know.)
- "Mr. Customer, if you buy our virtual private network, your online conversations will be private." (Until one of the participants decides to mismanage his encryption keys.)
- "Mr. Customer, if you buy our Enterprise Security Manager, you will be able to see all of your security on one platform, all in real time." (Until you realize your security administration guy is a closet member of the hacker group Thriving Evil Networks.)

We have been trying to bolster our network defenses using static, organizationally unrealistic, technically oriented products, which are all too often installed and managed by people whose security proficiency is nonexistent. So each time a new product class comes along, such as intrusion detection, people tend to say, "Wow! Finally, my troubles are over."

And what is the truth? I know too many organizations that have intrusion-detection systems and are experiencing more attacks than ever before; but that's another story. More than 60% of computer crimes originate from inside — not outside — the firewall.

All the static defenses in the world could not have predicted or prevented distributed denial of service or ILOVEYOU. Who knew that Microsoft Internet Information Server Web servers were going to collapse so easily under buffer overflow attacks? Security is dynamic and so must be our approach to defense and protection.

The worst thing that corporate management can do is become complacent because they survived the latest global cyberattack, upped their budgets, added staff or bought a new "it does everything" product.

Organizations need to plan for the unexpected — not the flood, fire or hurricane — but the truly unexpected. That means learning how to degrade your systems to a stable point, correct the errors and reconstitute them. But that takes policy, procedure and cooperation across the entire organization — which is rare indeed.

And because we never know what the next attack is going to be, what sort of vulnerabilities it will exploit and what the targets are, Roseanne Rosannadanna was absolutely right: "It's always something."

*Schwartau is president of Interpact, a security awareness consulting firm, founder of InfowarCom and author of the new book* CyberShock. *He can be reached at winns@gte.net.*

Feature

# Hack In

December, when protesters were rampaging through Seattle in an attempt to disrupt the World Trade Organization summit meeting, other activists were launching a denial of service (DOS) attack on the WTO Web site.

But the WTO's Web-hosting service spotted the attack and repelled it, bouncing the flood of page download requests back to the origin server, which was run by a group calling itself electrohippies.

The e-hippies coalition, based in the U.K., never publicly acknowledged that the attack had been turned back on its own server. But the next day, a notice appeared on the e-hippies site apologizing that "people have had problems getting through" to its site.

To retaliate or not to retaliate? In cyberspace, there is no simple answer.

Conxion, the San Jose hosting service that reversed the attack on the WTO server, recognized the attack was coming from a single IP address belonging to the e-hippies server.

"So we told our filtering software to redirect any packets coming from these machines back at the e-hippies Web server," says Brian Koref, senior security analyst at Conxion.

Conxion was so proud of having given the attackers a dose of their own medicine that it issued a press release about the incident. However, the reaction among IT professionals to the counterstrike was decidedly mixed.

Most IT professionals interviewed for this story said they would not strike back in cyberspace, for fear of hitting an innocent bystander. But they're not averse to taking some action when they're sure of the perpetrator's identity.

If vendor tools are any indication, fighting back may indeed be gathering acceptance in the IT community. Intrusion detection tools, for example, can be configured to reverse attacks. New reactive tools are also popping up in the marketplace, and freeware attack-reversing tools abound on the Web.

### Gray areas

Opponents of retaliation say reversing an attack is akin to taking the law into their own hands. They worry that they may inadvertently bounce the attack back to an innocent target and bring the law down on themselves.

"Fighting back is a bad idea. I wouldn't

## Off the record

### All say they would DO IT

This is not a scientific study, but when Greggory Peck, editor of the "HappyHacker.org" newsletter, asked his IT readers (mostly security and network management professionals) whether they would hack back, respondents said they would if the conditions were right. Here's some of their comments:

... I am really a developer more than a hacker dude. However, regarding physical self-defense, I am somewhat of an authority. I teach tactical firearms and Akido, and my former career had me actually implementing "physical countermeasures" in the field.

Regarding counterattacks in cyberspace, the major issue for me is truly identifying the "bad guy." Having said that, I think when you can ID the baddie, and when a counterstrike is necessary to abate a sustained attack, I would call a counterstrike OK.

There isn't any police department in the world that could realistically have the resources to hunt down a hacker who

Continued, next page

MICHAEL SLACK

# back

## Virtual vigilante or packet pacifist? Network executives have mixed feelings about whether to retaliate against an attack.

BY DEBORAH RADCLIFF

do it," says Al Potter, manager of network security labs at ICSA Labs in Carlisle, Pa. "If it's illegal for them to attack you, then it's also illegal to attack them. And then we have this whole problem of crossing state and national boundaries. I don't even want to go there."

Lt. Commander Chris Malinowski, who heads the New York City Police Department's computer crime unit, agrees: "Just because you're a victim, doing it back to the bad guy doesn't make it any less of a crime."

Both Potter and Malinowski say Conxion's actions fall in a gray area. Malinowski says what Conxion did could qualify as denying mail and returning it to the sender, something that in the eyes of the law would be legal.

"If they're functioning solely within their own system to take preventative action during an attack, there should not be a problem," Malinowski says. "Rejecting mail is a normal system administration function. Now if they were inserting their own mail and sending that back to the e-hippie site, you may have a problem."

### Know thy target

Conxion had a clear IP address trail to the e-hippies server, so it was simple to bounce the mail back to that address.

But consider that most crackers launch their attacks through hijacked IP addresses. The February distributed DOS attacks that crippled Amazon.com, eBay and others were launched from innocent "zombie" machines that had been hacked and were then commanded to do the bidding of the attacker. Had the victims retaliated by volleying the packets back to the source IP address, they would have shut down servers at legitimate businesses that had no knowledge of their part in the attacks.

"It would be blind luck to be placed into a situation where somebody is actually attacking your site from their own machine. The more typical case is the cracker has compromised one or several ISPs, telneting from one to the next, creating a nearly untraceable trail through the Internet," says Greggory Peck, a security analyst at a Fortune 500 company and editor of the "HappyHacker.org" newsletter.

Lance Dubsky, a security manager for a government agency he doesn't want named, knows of a case in which a system administrator at a private company hacked back.

Unfortunately, the IP address was fake and the administrator slammed an innocent target, which, in turn, traced the DOS attack back to the system administrator and alerted his superiors. The system administrator lost his job.

### Vendor approved?

Object lessons like that, however, are not stopping vendors from bringing a number of new reactive technologies to market. For example, Recourse Technologies in Palo Alto, Calif., and GTE Federal Network Systems in Arlington, Va. peddle cracker-trapping technologies called honey pots.

sent a Trojan (a hidden executable code) with the deliberate intent of retrieving certain data from your computer.

I can track them down faster than a police department — and I could send them a similar Trojan and erase the stolen files from their computer, optionally erasing my choice of other files.

The majority of hackers are virgin 12-year-olds using canned tools. Having to do some repairs after an attack goes wrong serves them right, I say.

... Courts generally accept that if someone came at you with a knife, you would be within your rights to hit them. Now if a guy pulls a knife on you and you pull a grenade launcher, well, that's different.

... Jesus said, "If you have a house and know the thieves of the night will come to rob you, you should make your house strong and prepare to defend it. ... If you know where the rebels will cross the river to attack you, you should gather those that believe as you and be at the river to attack and destroy them. ..." The problem and the solution are the same after all that time, only the methods differ.

DAVID POWERS

**Brian Koref, senior security analyst at Conxion, a Web hosting service in San Jose, detected a flood of e-mail coming into the World Trade Organization's Web site last December. He quickly reversed the attack, swamping the origin server.**

These are network boxes that act like fly traps, luring crackers so network monitors can observe the attacker's actions and gather the attacker's identifying information.

"There's a fine line between privacy and taking aggressive countermeasures," says Frank Huerta, Recourse's president and CEO. "Our Mantrap tool is more like using video surveillance in stores."

Watching for suspicious activity and gathering evidence against attackers is one thing. But other vendors — particularly intrusion detection vendors — offer the capability to configure their tools to take more action than just killing incoming connections. They also could be configured to trace the IP address and return a DOS attack, says Peck and others.

Peck says salespeople from security vendors have told him they wouldn't recommend launching a retaliatory strike, but they also boasted that their product was capable of being programmed to launch one.

Vendor-assisted or not, you still run into the problem of hitting an innocent target.

"If the intrusion-detection system is programmed for an automated response, you could deny service to an innocent party by sending the attack back to a forged IP address," says Scott Blake, security program manager at Bindview, an Internet security vendor in Houston.

Bindview also sells a reactive tool called the Zombie Zapper, which was released in March as a response to the distributed DOS threats. Instead of returning the DOS attack at the offending IP address, it impersonates the "master" of the slave machines and sends an order to those slaves to stop sending DOS packets. According to Blake, Zombie Zapper was downloaded more than 7,000 times in the two weeks following its posting.

With a number of freeware vigilante tools being posted on the Web, how far will commercial vendors go? And will network management professionals use these reactive tools?

ICSA's Potter, who says that most of these legitimate vendor products offer some of this reactive capability as "eye candy," thinks this trend won't go much further. Vendors, he says, will ultimately offer what buyers want, and buyers would prefer to see better passive protection in existing tools than new reactive capabilities.

But corporate network and security managers are becoming increasingly frustrated with Internet crime — cybercops can't keep up with it. Cracking comes at a hefty cost to corporate America, with financial losses due to computer crime costing 273 organizations nearly $266 million last year, according to a March report by the Computer Security Institute in San Francisco and the FBI.

"My experience, I'm sad to say, is that unless you are a very large organization — a multibillion-dollar company that is publicly traded and frequently in the media — whatever help is forthcoming from agencies like the FBI will certainly take a long time," Peck says. "But you, acting as your own security analyst, can accomplish a great deal more than can, say, the FBI."

Capt. John Jarrett, computer crime investigator with the Show Low Police Department in northeastern Arizona, would like to see more organizations get involved in actively protecting their assets. "I'd actually hope people get tired of things and take a stand," he says.

At the very least, Jarrett would like to see corporations do more of their own tracking of e-criminals so they can present evidence to the district attorney's office. But he, like Malinowski and other law enforcement officers, stops short of advocating retaliation.

So what's the solution? Start by building up your offensive posture. That means tightening and then testing the security in your network infrastructure, starting with your operating systems and working out to your perimeter firewalls and routers.

Brace your networks for more distributed attacks, nastier viruses and more chaos until these issues sort themselves out.

"[Cybercrime is] going to get worse before it gets better," Potter says.

*Radcliff is a freelance writer in California. She can be reached at derad@aol.com.*

MICHAEL SLACK

## New reactive tools

In addition to Recourse and GTE Federal Network Systems' "honey-pot hacker trapping technology," Network Ice, in San Mateo, Calif., makes a tool called BlackIce Defender for small offices and remote workers (www.networkice.com). Network Ice just announced an agreement under which Intel will bundle BlackIce for digital subscriber line modem users. BlackIce blocks some attempted attacks and catches the IP address of the attacker. Look for more reactive capabilities in the next version, says Greg Gilliom, CEO.

FREEWARE:

NetBuster (www.swipnet.se/~w-1244/netbuster/main.html) stops the NetBus Trojan from getting into the machine. It also can be used as a "fool-the-one-trying-to-NetBus-you" tool. It looks for the NetBus Trojan running on the attackers machine and reverses it to do whatever the cracker tried to do to you — take files, erase hard drives and so on.

Tambu UDP Scrambler (www.xploiter.com/tambu) — User Datagram Protocol (UDP) ports are one of the first points of entry hackers look for. This not only acts as a fake UDP port, it can also be used to cripple attackers' machines through a handy program called UDP flooder. All kinds of other hacking/fighting back tools are on this site. It is not recommended for use where this is illegal.

A stash of antihacking freeware can also be found at http://webattack.com/freeware/security/fwantihack.shtml.

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# A case of Cyberstalking

**Law enforcement agencies appear powerless to stop electronic harassment.**

BY DEBORAH RADCLIFF

Shortly after she fired a freelance photographer for downloading pornography, a vice president at the *Lexington Herald Leader* newspaper started getting strange phone calls from men who said they had met her in chat rooms and wanted to meet her in person.

Then came subscriptions to *Playboy, Penthouse, Playgirl, Bride* and *Seventeen* magazines, none of which she ordered. A male executive who was also involved in firing the photographer started getting calls from females who thought they'd met him in chat rooms he never visited.

The publisher of the Knight-Ridder newspaper in Lexington, Ky., began receiving porn spam. In the most outrageous twist, Jones Fish in Williamsburg, Ky., called the vice president to discuss her order to stock a five-acre lake with fish. Of course, she knew nothing about the order.

At that point, the newspaper managers thought it would be a fairly simple matter to report the incidents to the police and have the man arrested. Unfortunately, three years have passed, the harassment continues to this day, and authorities are apparently powerless to do anything about it.

With cyberstalking on the rise, the *Herald Leader* case provides a useful lesson for any network security executive who may run into a similar problem. When the incidents first began, the *Herald Leader* hired private detectives to track the activity back to the photographer. *Herald Leader* management pleaded with the postal inspector and the telephone company, contacted local and state police, and even the FBI, according to a high-ranking executive at the paper who asked not to be identified.

Under most state laws, this activity qualifies as stalking, which is usually a misdemeanor that law enforcement officials typically won't bother with unless there are more serious crimes or threat of bodily harm involved.

Because of these light penalties and the confusing, immature nature of state laws on cyberstalking, these cases are difficult to prosecute, says Lt. Commander Chris Malinowski, who heads the New York City Police Department's computer crime unit.

So what's a company to do if cyberstalking hits close to home?

"You have to attack things like this in phases," says Paul French, computer forensics lab manager for New Technologies, Inc., a training firm in Gresham, Ore. "First you find out who did it. Then get legal advice. And if you can't get it stopped, file a civil suit."

This is the procedure followed by Greggory Peck, a senior IT security analyst at a Fortune 500 company, when he stumbles across cyberstalking cases among his employers. He gets involved in such cases an average of three times per year, he says.

"This happens in almost every company I work for," he says. "People call me and say, 'I'm getting these very obscene e-mails.' The person doesn't know who it's from."

### Gather the evidence

Peck starts by logging every event, just as the *Herald Leader* did. Then he retraces the cybersteps of the perpetrator.

Companies that lack the skill to do this should look for a private detective who's well-versed in Internet evidence gathering, suggests Peck.

E-mail is the easiest to track by reading header information, following it back to the ISP, and enlisting or subpoenaing the ISP to match evidence with its customer information. To do this, the ISP must compare its logs for connections that coincide with the dates and times the mails were sent to the victim.

In the case of a chat room scenario, in which the attacker pretends to be someone he's not, tracking is a little more difficult because the person calling or mailing the victim has also been duped by the perpetrator who leaves no obvious IP address trail. But even this can be overcome with the help of the ISP.

"As a security analyst, the closest I've dealt with is someone using chat rooms to libel our company on a public message board," Peck says. "But we do have the ability, through 'little brother' probes and proxy servers, to see who went to chat at Yahoo.com at such and such time on Nov. 9, 1998," he says. "Then we could have used a subpoena to ask who's IP address this post originated from."

The next step is to get an attorney with some cybersmarts to help determine whether to seek criminal charges, file a civil suit or neither, advises Alan Wernick, a partner in the Chicago office and co-chairman of McBride Baker & Coles' intellectual property law department.

"Civil suits are one possible remedy," Wernick says. "If the cyberstalker is tying up company computer resources, then other issues may arise, like denial of use."

In that case, you're looking at a violation of the Computer Crime Act, which federal officials are obliged to look into. So if you want the help of

MICHAEL SIACA

law enforcement, look for activity like fraud or computer crime, or threat of bodily harm, Malinowski suggests.

For the most part, French and Peck follow the civil path because they, like the *Herald Leader,* can't find law enforcement officers to help them. And, Peck says, sometimes just a call to the perpetrator may be enough to stop the stalking. He says this is especially effective when you tell the harasser, "We know who you are. We know where you live. And we know what you're doing."

Unfortunately, following this process doesn't guarantee results. The *Herald Leader* case shows just how difficult it is to stop a cyberstalker, let alone prosecute one.

"We've tracked the IP address to the perpetrator's computer two times. We've gone to the county attorney's office and they won't touch this," says a *Herald Leader* executive who asked not to be identified. "We've gone to the Lexington Police Department, the state police, even the FBI. Our publisher has spent a lot of time trying to keep law enforcement interested. What else can we do to get this stopped?"

*Radcliff is a freelance writer living in California. She can be contacted at derad@aol.com.*

www.nwfusion.com

## CYBERSTALKING RESOURCES

**Here are links to some of the more informative sites relating to cyberstalking and the laws surrounding stalking over the Web.**

- Resource list for cyberstalking issues: http://cyber.findlaw.com/criminal/cyberstalk.html
- The Dept. of Justice's 1999 report on cyberstalking, initiated by Al Gore: www.usdoj.gov/criminal/cybercrime/cyberstalking.htm
- National Center for Victims of Crime's state-by-state guide on stalking: www.nvc.org/law.statestk.htm and www.ncsl.org/programs/lis/CIP/stalk99.htm
- Earliest cyberstalking prosecution in 1996: http://detnews.com/men/stories/41019.htm
- A $10 million lawsuit filed against a pair of cyberstalkers in the latest twist involving a faux literary agent accused of harassing author Joan Hitchcock through online chat rooms: www.naplesnews.com/today/local/d387482a.htm

DocFinder 8322 find it online

Just remember that if you're filing damages in a civil suit, most perpetrators don't have much to lose, Malinowski says. If you know the perpetrator's whereabouts, he advises to instead contact the prosecutor in the perpetrator's jurisdiction. State prosecutors, he says, are currently organizing and gearing up to deal with new cyberstalking laws coming out on a state-by-state basis. And when you do contact the prosecutor, bring logs and evidence that point to the perpetrator, Malinowski says.

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**And I am a chaiienge.**

**I confound the Chairman,**

**confuse the co-worker,**

**and mystify aii mere visitors**

**to the digital domain.**

**But some know**

**that with this science**

**comes this security**

**for Chairman and co-worker aiike:**

**I put their progress first.**

***Does anybody put me first?***

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NetworkWorld REVIEW Cisco Switches

# Cisco's mid-market plunge

***The new Catalyst 3548 XL, 2948G-L3 and 4908G-L3 switches make the performance grade but fall short in QoS capabilities.***

BY JOHN BASS, NETWORK WORLD TEST ALLIANCE

With the recent introduction of three new midmarket LAN switches, Cisco is geared to offer enterprise-class features and function to smaller business networks. We took a hands-on first look at these new fixed-port, rack-mountable models — the Cisco Catalyst 3548 XL, 2948G-L3 and 4908G-L3 — and found that overall they perform respectably, are loaded with features, and scale fairly well. However, we found the quality-of-service (QoS) features of the 3548 XL and the 2948G-L3 fell somewhat short.

The Catalyst 3548 XL is a Layer 2 switch that has 48 Fast Ethernet ports and two Gigabit Ethernet Interface Connector (GBIC)-based ports. This switch is designed for the wiring closet and acts as an aggregation point between hosts and the network. GBIC ports allow an administrator to install multimode, single-mode or GigaStack modules. GigaStack modules are small proprietary modules limited to 1G bit/sec bandwidth each and fit into the GBIC. The modules serve as an inexpensive way of connecting the switches without having to spend a lot of cash on Gigabit Ethernet optics.

The 2948G-L3 is similar to the 3548 XL in that it has 48 Fast Ethernet ports and two GBIC ports but is a multilayer switch that provides unicast and multicast Layer 2 and Layer 3 switching functionality. The 4908G-L3, also a multilayer switch, has eight GBIC ports. The 2948G-L3 and 4908G-L3 provide core campus routing functions. The 4908G-L3 can be used to connect multiple 2948G-L3 switches.

Our testing showed that the 3548 XL will work in the wiring closet as long as the traffic through the box does not exceed 8G bit/sec and there is no need for virtual LAN traffic priority queuing. The 2948G-L3 and 4908G-L3 work well in the core of the site network, but the 2948G-L3 suffers from some queuing problems.

### Performance

To test the overall performance of these switches, we looked at Layer 2 throughput and latency for all three, and Layer 3 throughput and latency for the Catalyst 2948G-L3 and 4908G-L3 models.

We noticed that immediately after running a Layer 2 throughput test on the 3548 XL, the throughput measurements were below wire speed. With 64-byte packets we could achieve 75% of wire speed. As the packet size increased, so did the loss. With 1,518-byte packets we achieved only about 50% wire speed. The throughput curve dipped a little at 1,02-byte packets, dropping a little more than 60% of the packets. After talking with Cisco support, we learned that the 3548 XL has a backplane bandwidth limitation of 8G bit/sec throughput. This is far less than the 13.6G bit/sec that can be generated by the 48 Fast Ethernet ports and the two Gigabit Ethernet ports configured for full-duplex operation. Cisco also said the decreasing throughput as the packet size increases is caused by the behavior of the internal Application Specific Integrated Circuits in the switch.

Cisco engineers say the backplane limitation is justifiable because this switch is designed to be a host concentration device — not a backbone device. Typically, a concentration device doesn't see large, sustained amounts of bandwidth. We agree with this deployment assessment, but losing 25% of small packets and 50% of large packets still seems a little precarious. What about those voice and video streams? There may not be a problem now, but as your traffic grows, this behavior could cause some interesting troubleshooting situations.

The 3548 XL sees a maximum of about 135 microsec average latency with 1,518-byte packets at full load. We measure latency as the amount of time it takes to get the first bit of a packet out of one of our Netcom Smartbits cards, through the device, and into a second Smartbits card. We think this latency rating is a good one.

Our Layer 2 performance testing on the other two Cisco switches showed that the 2948G-L3 and the 4908G-L3 operate at wire speed, meaning all ports can operate at full bandwidth in full-duplex mode without any packet loss. The average latency measurement for the 2948G-L3 and the 4908G-L3 were 132 and 31 microsec, respectively, with 1,518-byte packets at full load.

Our Layer 3 throughput and latency testing was limited to the Catalyst 2948G-L3 and 4908G-L3 models. Both boxes achieved wire-speed throughput in the Layer 3 tests. There was little noticeable change in the latency tests between Layers 2 and 3.

### Rating scalability

We evaluated the scalability based on how easily these switches could be stacked and whether the backplane capacity could scale with network traffic growth.

The 3548 XL has excellent scalability with the GigaStack GBIC option, but the backplane bandwidth limitation restricts the number of switches that practically can be chained together. The

## NetResults

**A look at three new midmarket switches from Cisco**

### Catalyst 3548 XL

**RATING:** 7.8

**Company:** Cisco
**URL:** www.cisco.com/warp/public/cc/sol/mkt/smb/midmkt/ **Price:** $4,995. **Pros:** Inexpensive, good management features. **Cons:** Slow backplane.

### Catalyst 2948G-L3

**RATING:** 8.1

**Company:** Cisco
**URL:** www.cisco.com/warp/public/cc/sol/mkt/smb/midmkt/ **Price:** $9,995 **Pros:** Great Layer 2 and Layer 3 performance. **Cons:** QoS features are weak, no scalable configuration interface.

### Catalyst 4908G-L3

**RATING:** 8.8

**Company:** Cisco
**URL:** www.cisco.com/warp/public/cc/sol/mkt/smb/midmkt/ **Price:** $14,995 **Pros:** Flawless performance. **Cons:** No scalable management interface.

| | Performance 25% | Scalability 20% | Features 20% | Manageability 15% | Installation 10% | Documentation 10% | Total score |
|---|---|---|---|---|---|---|---|
| Cisco 3548 XL | 6 | 8 | 9 | 9 | 9 | 6 | 7.8 |
| Cisco 2948G-L3 | 7 | 10 | 8 | 8 | 9 | 6 | 8.1 |
| Cisco 4908G-L3 | 10 | 10 | 8 | 8 | 9 | 6 | 8.8 |

**Individual category scores** are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score.**

3548 XL has an 8G bit/sec backplane limitation, which is a little better than half the rate that can be generated by its ports. This device is designed to go between hosts and the core network, so backplane rates most likely will stay below this 8G bit/sec limit — this is something to keep in mind if you decide to deploy this switch in your network. Instantaneous rates may exceed this limit and create problems for such applications as video or voice. Otherwise, upper-layer retransmissions should take care of the problem.

With the GigaStack GBIC option in place and wire-speed performance achieved on both accounts, the 4908G-L3 and the 2948G-L3 earn perfect scores for scalability.

### Sizing up the feature set

In our evaluation of each box's feature set we looked at multicasting, virtual LAN (VLAN) support, tools for addressing Spanning Tree Protocol (STP) issues and QoS capabilities.

Because the 3548 XL is a Layer 2-only switch, it doesn't support multicast routing, which is the ability to forward multicast traffic to other ports without having to flood the traffic to all ports. However, it supports the ability to minimize the amount of multicast traffic that it floods to its ports. This feature is implemented using a combination of Internet Group Management Protocol (IGMP) and Cisco Group Management Protocol (CGMP). IGMP is used between hosts and a router, and CGMP is used between a router and the 3548 XL. Hosts join multicast groups by sending a "Join" message to a multicast-enabled router. The router sends CGMP messages to the 3548 XL to advertise which hosts have joined which multicast groups. The 3548 XL can match this information with information in its bridging table. The 3548 XL will then only forward multicast traffic to ports that have group members connected to them. This feature was not tested for this review because of time constraints.

The need for CGMP is questionable, because the switches could be designed to snoop IGMP traffic to find the same information gathered from CGMP. We would prefer that the 3548 XL sniff IGMP instead of having to support an unnecessary proprietary protocol.

The Catalyst 2948G-L3 and the 4908G-L3 support multicast routing. We tested both switches with the Protocol Independent Multicast Dense Mode routing protocol and IGMP Version 2 enabled. Both boxes performed well in routing multicast and unicast traffic up to wire speed.

Multicast forwarding latency on both switches was similar to that of Layer 3 forwarding latency. The latency for the 2948G-L3 was 145 microsec — only a 4% increase over the Layer 3 forward latency measurement. The join latency, which is the measurement of the time it takes for a host to join a multicast group through IGMP and begin receiving multicast traffic, is around 0.5 seconds. The leave latency, which is the amount of time between sending a leave message through IGMP and seeing the multicast traffic disappear, is around 3.5 seconds.

The multicast forwarding latency for the 4908G-L3 came in at about 24 microsec — very similar to its Layer 3 forwarding latency. The 4908G-L3 takes about 0.5 seconds to service a group join and about 3.5 seconds to service a leave.

We think these latency times are very reasonable for most network applications.

To test VLAN features, we set up 12 VLANs on the 3548 XL. The 3548 XL was able to forward packets properly within these VLANs. The 3548 XL properly contained broadcast traffic within each of the 12 VLANs.

Because the 3548 XL is meant to be an access device that is connected to hosts, it's important that the switch discard bad packets so bandwidth in the core of the network isn't wasted on bad packets. The 3548 XL properly discards packets with cyclic redundancy check (CRC) errors, packets with alignment errors, those that are too big and/or too small. CRC is a way of encoding a fingerprint of the data in the packet in a small space.

Because the 2948G-L3 and 4908G-L3 boxes are meant to be used as route aggregation devices and not access devices, the VLAN testing does not fit the function of the boxes.

The 3548 XL switch supports Cisco's proprietary STP enhancement features to improve the convergence time of STP in large networks. The features include the ability to designate what ports are to be involved in the STP calculation, which ports are active and which are used as backup in a redundant link topology. The utilities also provide a way to speed convergence during loss of connection to the root bridge.

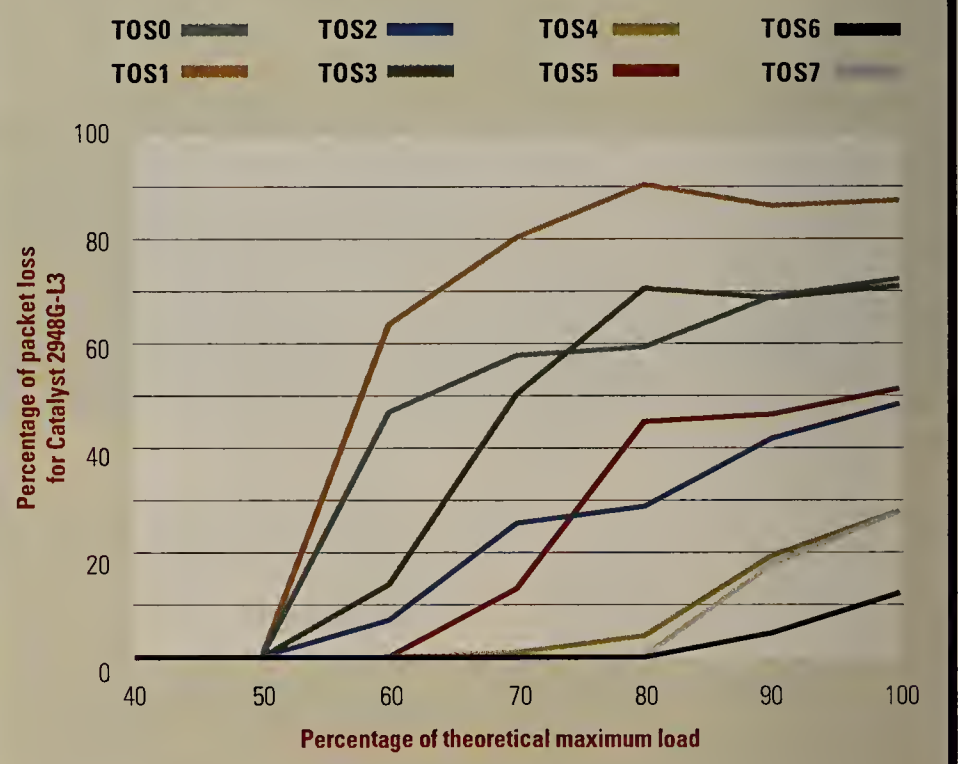
STP ensures that bridging loops do not occur in a Layer 2 network. Bridging loops can bring a network to its knees, filling the network links with copies of the same packet. The basic function of STP was not tested, because it's a given with this type of device. It's a very mature protocol that's been around for years. Without it, a switch is basically worthless.

The problem with STP in a large network is the convergence time. STP calculates a logical tree structure through the Layer 2 network and disables ports not participating in the tree. Because trees don't have loops, once the tree is established, loops are guaranteed not to exist. This calculation time, also known as convergence, can take a

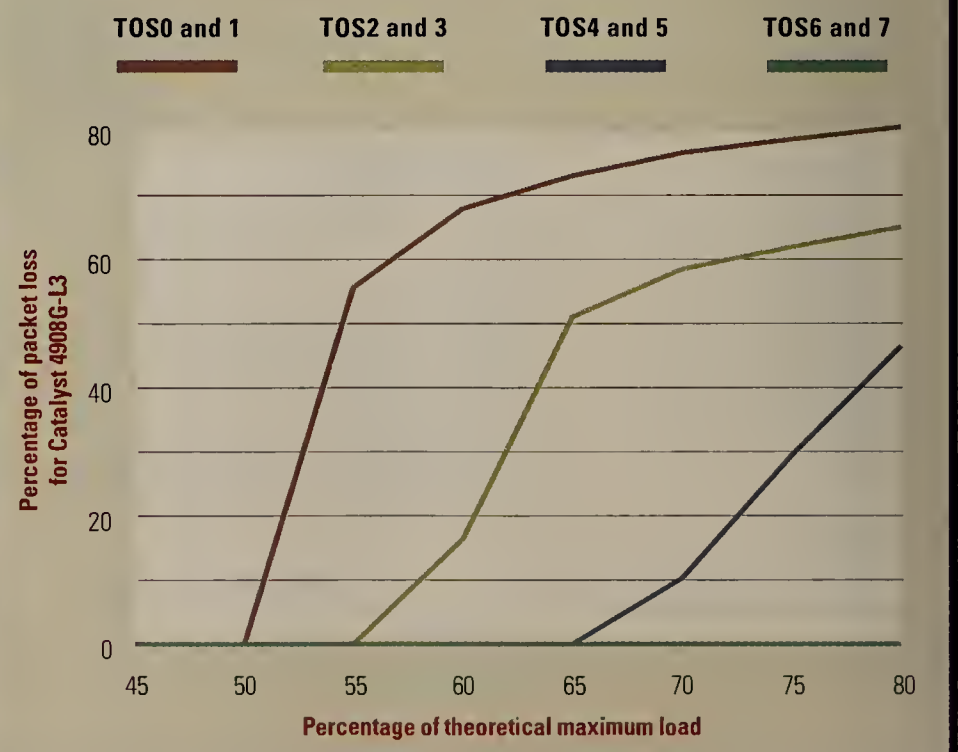
See **Cisco,** page 62

## Setting priority with the midmarket Cisco switches

**Our testing shows that the Catalyst 2948G-L3's ability to prioritize traffic based on IP precedence is abnormal — packets marked with higher priority values in fact received lower priority by the switch.**




**The Catalyst 4908G-L3's QoS behavior was much better. However, our testing shows that in practice the 4908G-L3 has four priority queues as opposed to eight — ToS values 0 and 1, 2 and 3, 4 and 5, and 6 and 7 were grouped together in pairs instead of holding their own priority levels.**



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Cisco
continued from page 60

while to finish — the larger the network, the longer the convergence time. The network is down while the tree is being calculated. The tree gets recalculated when a link becomes active.

The 3548 XL has two proprietary features to reduce convergence time. A feature called portfast removes ports from the STP calculation. This decreases the time it takes for STP to converge. This feature is only to be used on ports that are connected to hosts, not on ports that are connected to other switches. With this feature enabled on the 3548 XL, the convergence time was reduced from 30 seconds to about 3 seconds.

Cisco also includes another feature called uplinkfast. This feature allows redundant links in a Layer 2 topology to be instantly made active in the event of a link failure. To test this feature, uplinkfast needs to be implemented on all switches involved in redundant links. Uplinkfast is only implemented on the 3548 XL, so we were unable to test this feature.

Neither the 2948G-L3 nor the 4908G-L3 support the portfast and uplinkfast features.

Cisco delivers some QoS capability in these new midmarket switches. However, our tests demonstrated that the support does not go all the way.

Cisco advertises that the Catalyst 3548 XL can prioritize traffic based on 802.1Q VLAN priority bits. We were unable to get this to work. The only way we could get the 3548 XL to prioritize traffic was to override the feature that prioritizes traffic based on VLAN tag. We gave individual ports priority to test the QoS scheduling algorithms in the box. We found that this feature works as expected.

We tested the Catalyst 2948G-L3's ability to prioritize traffic based on IP precedence. We tested this feature and found a few interesting behavioral problems. Packets with type-of-service (ToS) values of 0 got a higher priority than ToS values of 1; ToS values of 2 got a higher priority than ToS values of 3; and so on. But ToS values of 0 got about the same priority of 3; 2 the same as 5; and 4 the same as 7. QoS on the 2948G-L3 is a mess.

The Catalyst 4908G-L3's QoS behavior is much better than that of the 2948G-L3. From the results of our testing, it seems that the 4908G-L3 has four queues. ToS values 0 and 1, 2 and 3, 4 and 5 and 6 and 7 were grouped into four separate queues. The two ToS values in the same queue receive the same priority.

### Management

The 3548 XL can be centrally managed by one IP address, using Cisco's Switch Clustering feature. One switch is configured with an IP address and is defined as the command switch. All switches then run a proprietary protocol to discover each other and define how the command switch acts as the management interface to the other switches through a built-in Web server.

The end result is that an administrator can access the Web management interface of the cluster of switches via one IP address. The switches support SNMP, telnet and Trivial File Transfer Protocol for manual management. We recommend using the Web interface, because it is the easiest to use and lets you manage multiple switches.

The 2948G-L3 and 4908G-L3 do not have a scalable Web configuration interface like the 3548 XL. This would be a useful addition.

Installation is a breeze for all these boxes, but documentation is lacking in absolute detail of all features and commands. The Cisco Web site is very helpful in finding the proper information, but we had to rely on Cisco support a few times to find the proper command to configure the switch.

Overall, we recommend these switches for use in small networks because they're inexpensive, perform well and offer some of the advanced features available in Cisco's higher-end boxes. However, be judicious in which enterprise features you choose to deploy, because they don't all work as advertised.

*Bass is the technical director of Centennial Networking Labs (CNL) at North Carolina State University. CNL is a network testing lab that specializes in function and performance test of networks and networking equipment. Bass can be contacted at john_bass@ncsu.edu.*

## How We Did It

We broke testing into several categories — Layer 2 switching, Layer 3 IP routing, IP Multicast, quality of service (QoS), virtual LANs and Spanning Tree Protocol (STP) support. We used Smartbits 2000 and Smartbits 6000 cards from Netcom systems for all testing. Visit www.netscomsystems.com for more information.

We used ML-7710 Fast Ethernet Layer 3 cards in the Smartbits 2000 chassis and LAN-6201A cards in the Smartbits 6000. For all tests, each Fast Ethernet port was set for full duplex, 100M bit/sec operation, and the Gigabit Ethernet ports were set for full-duplex operation. We disabled Ethernet autonegotiation for all ports on the switch under test.

For Layer 2 testing, we measured the throughput and latency of the switch with the transmitting and receiving ports in a pairwise bidirectional configuration, and the transmitter and receiver in a full-mesh configuration. For the switches that have gigabit ports and Fast Ethernet ports, we did not run full-mesh tests, because the gigabit ports can easily overrun the Fast Ethernet ports. For Layer 3 testing, we measured the throughput and latency of the switch with the transmitting and receiving ports in a bidirectional, pairwise manner.

The pairwise throughput tests were run to measure the maximum throughput before loss. The latency values were calculated by measuring the time it takes to transmit the first bit of a packet from the transmitting Smartbits card and then receive the first bit back into the receiving Smartbits card.

We conducted three tests to evaluate IP Multicast performance — mixed class throughput, forwarding latency, and group join/leave latency. Since these tests require multicast routing ability, we only ran these tests against the Catalyst 2948G-L3 and 4908G-L3.

The mixed-class throughput test looked at the packet loss of the device under test with equal amounts of unicast and multicast traffic within a multicast group. The unicast traffic was sent in a full-mesh manner between receivers in a multicast group. This test analyzed how the switch reacted to multicast and unicast traffic occurring at the same time.

The multicast forward-latency test measured the time it took to forward multicast traffic. The group join/leave latency test measured how long it took for the switch to start forwarding multicast traffic once an Internet Group Management Protocol (IGMP) Join message was received from a group member, and how long it took the switch to stop forwarding multicast traffic once the last group member on a port sent an IGMP Leave message.

To test QoS, we ran two tests, depending on the device. For the Catalyst 3548 XL, we ran a virtual LAN (VLAN) priority test. For the 2948G-L3 and 4908G-L3 we ran an IP precedence QoS test.

The VLAN priority test evaluated the switch's ability to prioritize traffic based on the 802.1Q priority bits in an Ethernet packet header. Once we found that the 3548 XL did not properly prioritize traffic based on the VLAN priority bits, we modified the test to create a default priority per port.

The IP precedence test sent eight streams with equal numbers of packets for each possible IP precedence value. These streams were transmitted into two ports. Each of the streams was forwarded to a third port. The traffic was sent in varying amounts until the third port was overloaded. We measured the packet loss on the third port for each of the streams to evaluate if the streams were prioritized.

We tested VLANs on the 3548 XL by evaluating VLAN functionality. We looked at VLAN by port, broadcast frames and illegal frame filtering.

The VLAN-by-port test ensured that VLAN traffic remained within the ports that were on that VLAN. The broadcast-frames test verified that broadcast frames were contained within the ports that were members of a VLAN. The illegal-frame-filtering test evaluated the switch's ability to properly drop packets with bad cyclic-redundancy check values, alignment errors, and packets that were too small or too big.

We measured the 3548 XL's ability to reduce the STP convergence time using proprietary Cisco Spanning Tree optimization features. We tested the portfast feature by setting up all three switches in a triangle topology and measuring the time it took for the network to recover when one of the active links between the switches went down. The network switched to one of the redundant links. Once this value was found, the network was reconfigured to enable portfast on the ports that weren't on links between the switches. The test was rerun to see that the convergence time was reduced.

# Cool Tools

*Quick takes on high-tech toys*

Keith Shaw, Reviews Editor

## NO GRAFFITI

I hate Graffiti. Not the spray-painted artwork you find in the New York subway system, but the Palm OS program that expects you to learn Egyptian hieroglyphics in order to make a proper T, K or F. Even after several weeks of practice, I find myself scribbling gibberish when trying to input calendar appointments or contacts. I also don't enjoy the hunt-and-peck portion of the tiny onscreen keyboard that comes with the Palm.

Searching for alternatives, I found the Palm Portable Keyboard, an ingeniously well-designed keyboard that folds up to the size of your Palm, and Textware Solutions' FitalyStamp program and overlay stickers. Both are viable options if you want to ditch Graffiti.

The Palm keyboard unfolds in four equal, accordion-like pieces. To set it up, slide in the outer left and outer right portions of the keyboard to connect to the middle two pieces. A third wire and plastic slider on the keyboard's top lets you create a "tent" that supports your Palm and has the familiar connection port. Install the keyboard software on your Palm and you're ready to type.

The keys are about as large as a standard laptop's, which makes typing easy. The keys give good resistance when you type. Included are keys that let you perform Palm functions without using the stylus. If you're writing a lengthy memo or responding to your e-mail, you'll love having this keyboard.

The second option I tried was the FitalyStamp program and overlay stickers. For about a third of the keyboard price, the program includes stickers that you place over the Palm Graffiti writing area. The sticker contains larger letters for you to hunt-and-peck with, much larger than the onscreen equivalent. After you install the program on your Palm, you can then type letters using the overlay sticker. The sticker isn't glued to the Palm, so you can attach or reattach the sticker with relative ease.

I liked how the sticker included areas for numbers as well as letters, since switching between the number and letter keyboard on the Palm's onscreen keyboard can be tedious. However, if you're not completely accurate when you place the sticker on the Palm, your typing may pick other letters instead of the letter you tapped.

However, both options are better than the Graffiti program.

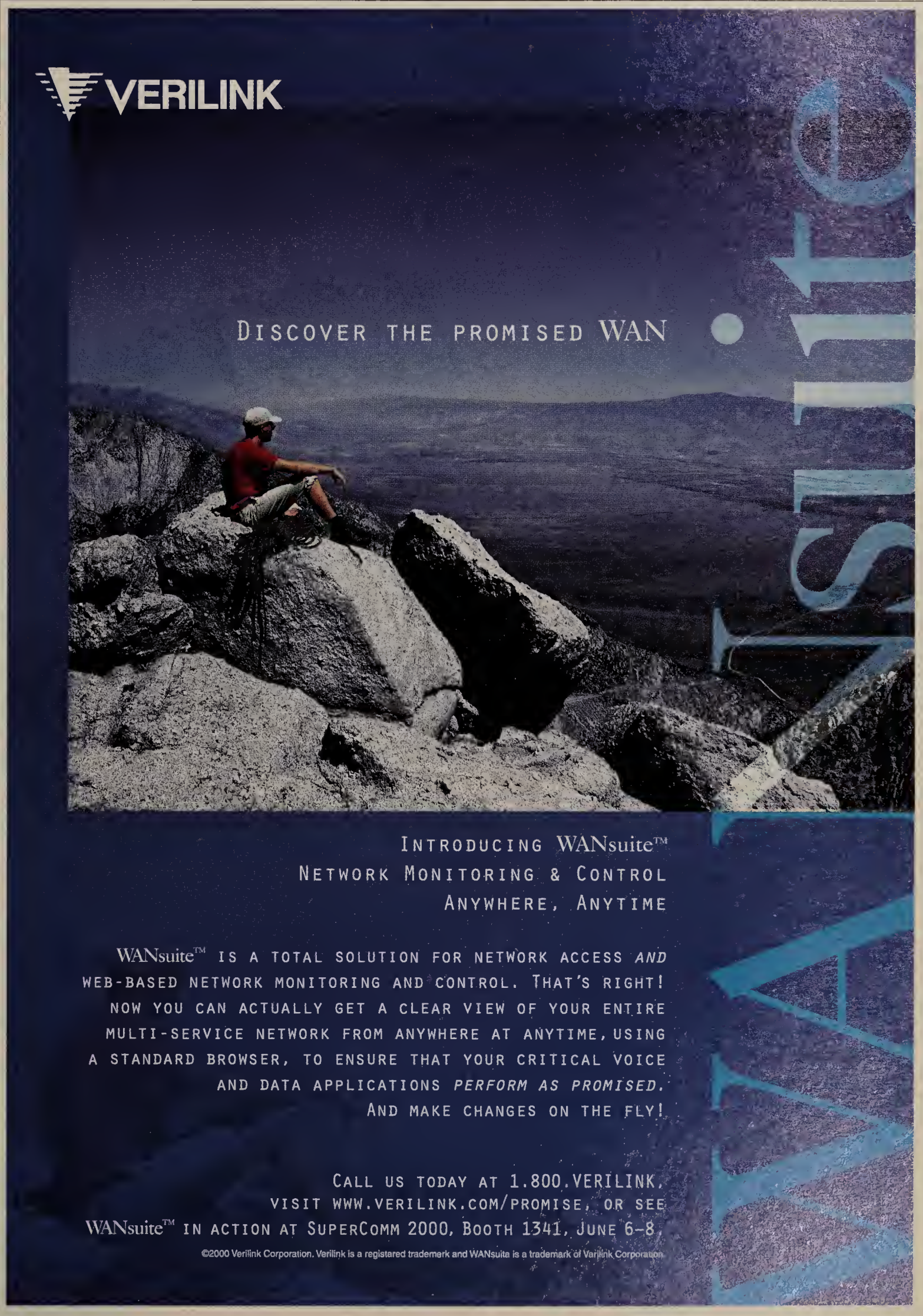
### Net Results

#### Palm Portable Keyboard

| | |
|---|---|
| **Vendor:** | Palm |
| **Web site:** | www.palm.com/products/keyboard |
| **Cost:** | $99 |
| **Bottom line:** | The keyboard to get. |
| **Rating:** | ★★★★ |

#### FitalyStamp

| | |
|---|---|
| **Vendor:** | Textware Solutions |
| **Web site:** | www.fitaly.com/palm/palmfitaly.htm |
| **Cost:** | $35 |
| **Bottom line:** | Better than Graffiti. |
| **Rating:** | ★★★½ |

# We can't predict what our hosts might say, but at least you'll know when they say it.

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# Management Strategies

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# Dicey ethical dilemmas

***Before you track employees' Web surfing habits, make sure your company has a clearly defined policy.***

BY DEBORAH RADCLIFF

The head of marketing thinks one of his subordinates spends too much time surfing the Internet. He asks you to monitor the employee's e-mail, URL stops and Web downloads, and wants the logs on his desk in a week. Do you:

a) Blindly obey and set up watch on the employee without his knowledge or permission?

b) Check the employee guidelines?

c) Ask the opinion of corporate counsel?

Thanks to the Internet, network professionals are running into ethical dilemmas like this with increasing frequency. Most of these ethical issues deal with perceived privacy rights, whether it is the privacy of employees, consumers or the corporation's intellectual property itself.

"Technological access to information and processing power today is unprecedented. Over the past 12 months, this has converged with a hot issue: privacy," says Chris Zoladz, vice president of information protection for Marriott International in Bethesda, Md. Having transferred from the internal audit group, Zoladz now defines and builds policy around IT ethical issues such as privacy and employee's systems usage.

Karen Coyle, a longtime volunteer with Computer Professionals for Social Responsibility in Palo Alto, says such issues are often left to the IT department to address. "I lecture on privacy all the time, and I explain that this really isn't a computer issue, it's a business issue," Coyle says. "People blame computers for this, but there have always been things to distract us at work."

Both Zoladz and Coyle agree it all boils down to policy. That policy should be clearly understood by employees, consumers or whoever else expects a reasonable right to privacy.

During the last year, e-businesses have adopted policies and common disclosure templates to inform consumers how their data will be used. However, most employers have all but ignored internal policies, says Zoladz, who previously spent 13 years at Ernst and Young providing auditing services for clients.

Not only are networking professionals in the dark, so are users. Most employers fail to set acceptable-use policies and procedures for how information access is granted and who owns the information, Coyle and Zoladz say. Even worse, they say, employers often fail to inform employees that their computer use is being monitored.

Chris Zoladz of Marriott International is drafting information protection guidelines for employees.

SAM KITTNER

"In most cases, employers have not made it clear what they consider appropriate use of computer technology," says Coyle, who by day builds computer library systems for the California Digital Library in Berkeley, Calif. "Most people I lecture to aren't even aware that they have no right to privacy at work, that their e-mail belongs to the company."

Currently, Marriott is building an employee-policy guideline, tentatively titled the "information protection agreement," which will inform employees of their expected behaviors in three areas:

- Information security and confidentiality, which includes the privacy of customer and corporate data.
- Electronic communications, which dictates the expected behaviors for use of e-mail and Internet resources.
- Software use, which states that all business software must be licensed.

Marriott's policy also covers action taken when suspected misuse is identified. For example, Zoladz realizes that some requests to monitor employees may be motivated by company politics. So, to protect Marriott against a wrongful dismissal suit, any monitoring request requires the review and signature of two to three people inside the Marriott organization — and Zoladz has the final sign-off.

"We make it clear to employees that they should have no expectation of privacy on the Internet and e-mail here at work. But that doesn't mean we routinely look at what they're doing," Zoladz says.

Policies like these are the exception rather than the norm. Until businesses wake up to the issue, the impetus falls on networking professionals to raise awareness and begin the process of building ethical computer-use policies, Coyle says.

"The business side is not going to think of these things," she says. "Part of our job ethic is we should be the ones to speak up."

*Radcliff is a freelance writer in northern California. She can be reached at derad@aol.com.*

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Sample policies: Privacy and e-mail usage and monitoring.

Rules to live by: 10 commandments of computer ethics.

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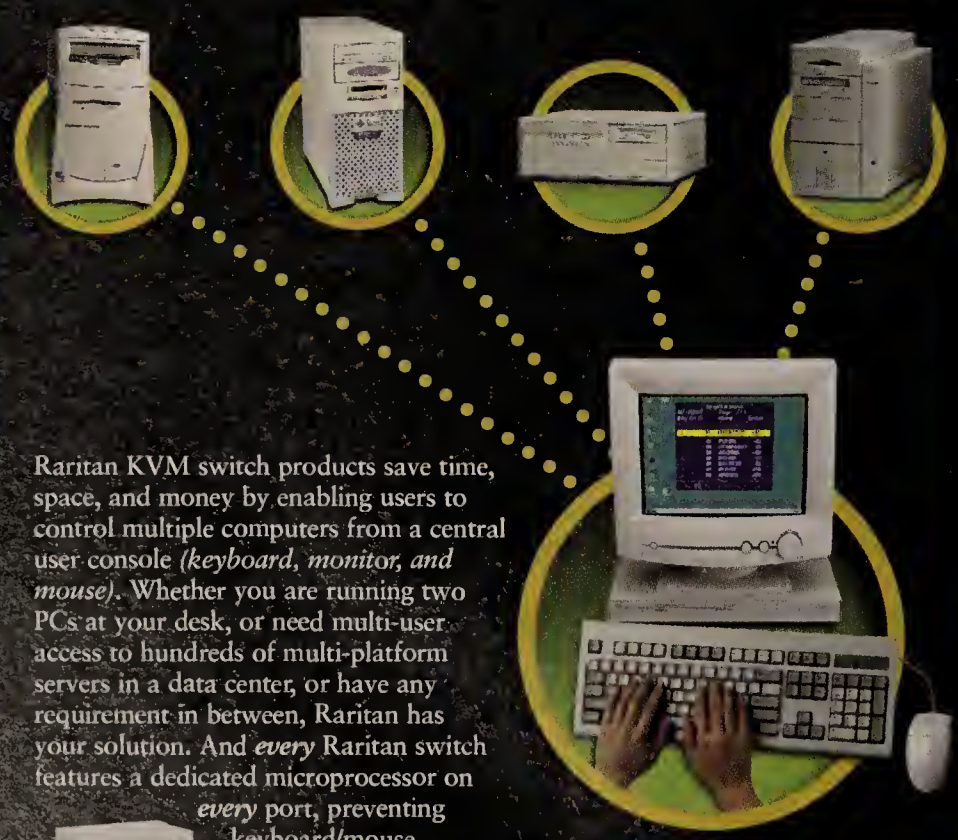

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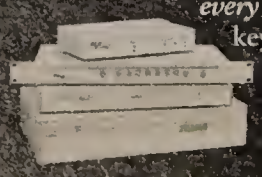

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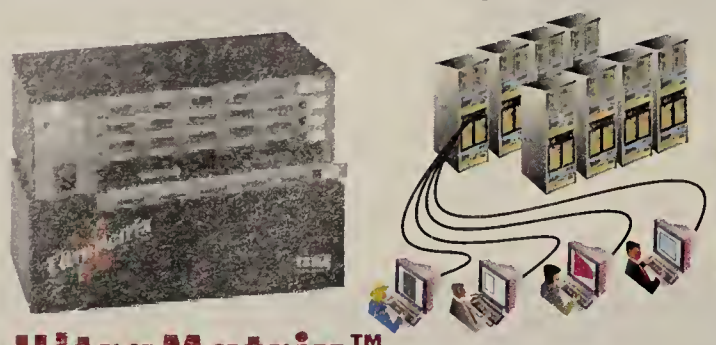

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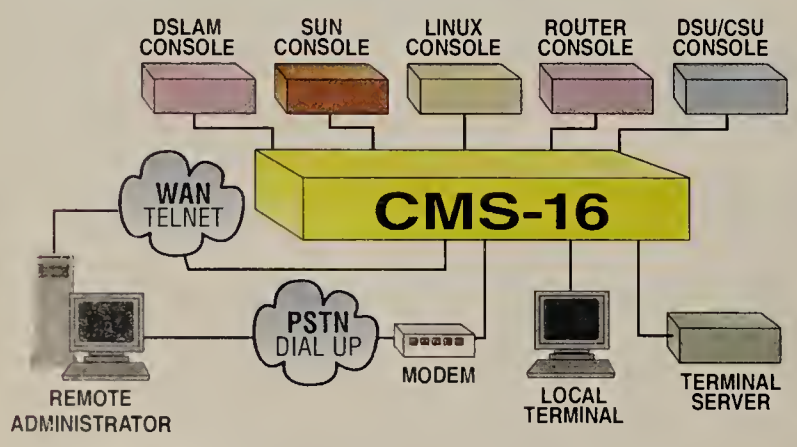


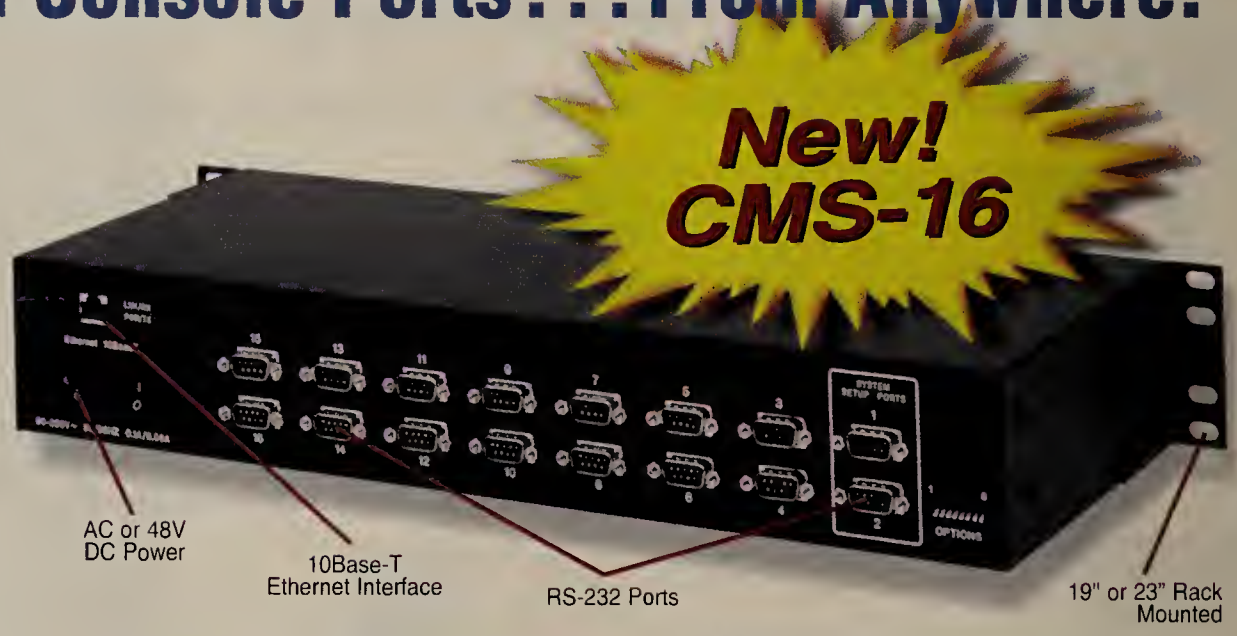


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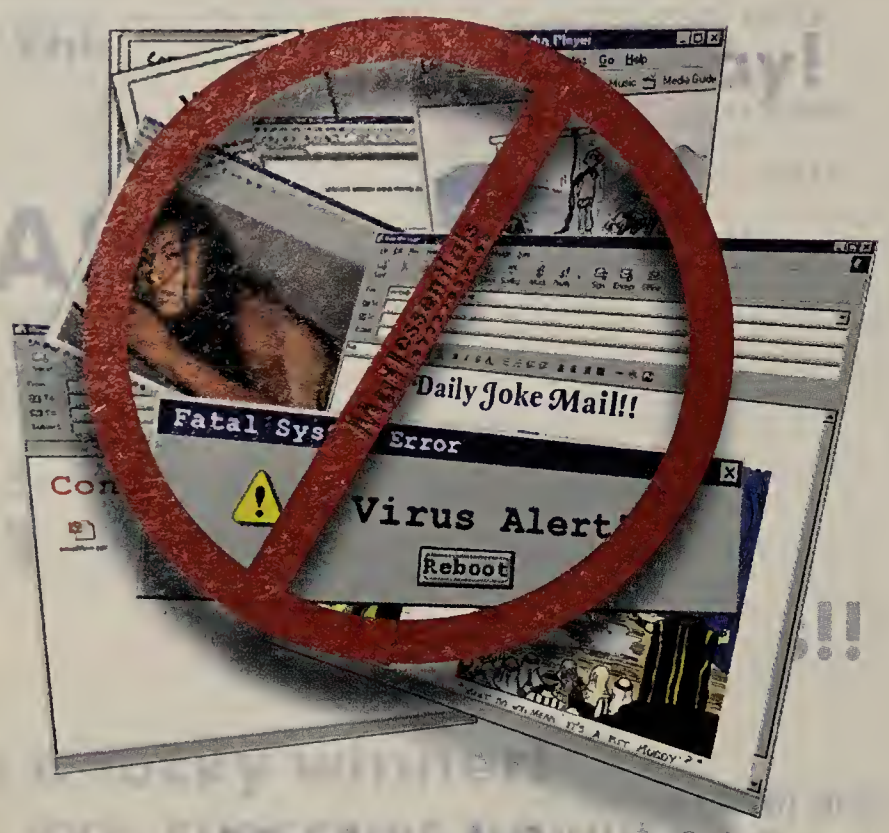


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## Software Engineers

*IRIS Associates*, the creator of Lotus Notes, Lotus Domino and Lotus Domino Designer, seeks to fill a number of Software Engineering positions at various levels of responsibility at our location in Westford, MA.

All positions require a BS degree (or equivalent) in Computer Science or other relevant field, together with at least 4 to 7+ years' relevant experience.

**Senior Software Engineer (QuickPlace Internals)**

• XMl./SSL processors in Java and C++

**Principal Software Engineer (Notes Client Editor)**

• HTML & Int'l. char. processing/bi-directional

**Principal Software Engineer (Lotus-Iris Products Designer/Server Administration)**

• Visual Design, Product Mgt., Int'l. Products

**Project Manager (Domino Web Engine)**

• Multiplatform, HTML, DHTML, Javascript

**Numerous Other SWE Positions/Levels**

• Software Design, Coding, and Testing

Competitive benefits and starting salaries from $57,250-$102,600, commensurate with the position's specific responsibilities, accompany this exciting high-tech environment growth opportunity.

**Please mail or fax your resume, indicating Reference Code "IMSP," to: Iris Associates, Attn: Human Resources, Five Technology Park Drive, Westford, MA 01886; Fax: 978/392-6060. Email: Irisimspjobs@iris.com**

**Visit: www.iris.com. Iris Associates, a subsidiary of Lotus/IBM, is an Equal Opportunity Employer.**

iris ASSOCIATES

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Microcomputer Support Specialist (Orlando, FL): Install, modify, & make minor repairs to microcomp h/ware & s/ware systems & provide tech'l assistance & training to systm users: Inspect microcomp eqpmt & read order sheet listing user reqmts to prep micrcomp for delivery. Install or assist service personnel in installation of h/ware & peripheral components, such as monitors, keyboards, printers & disk drives on user's premises, following dsgn or installation specs. Load specified s/ware packages, such as operating systms, word processing, or spreadsheet prgms into comp. Enter commands & observe systm functions to verify correct systm operation. Instruct user in use of eqpmt, s/ware & manuals. Answer client inquiries in person & via telephone concerning systms operation; diagnose systm h/ware, s/ware & operator probs & recommend or perform minor remedial actions to correct probs based on knowl of systm operation. Replace defective or inadequate s/ware packages. Refer major h/ware probs to service personnel for correction. Attend tech'l conferences & seminars to keep abreast of new s/ware & h/ware product dvlpmts. Bach in Comp Sci or equiv exp w/HP PC's, netservers, printers & notebooks; Compaq servers, printers & notebooks; Fujitsu printers & notebooks; & Novell & MS networking operations. $42,524 /yr. $31.91 OT; 40 hrs/wk during normal business hrs, 8:30a-5:30p, M-F; 5 hrs OT/wk. Resume to: FDLES Bureau of Workforce Prgm Support, PO Box 10869, Tallahassee, Fl 32302-0869. JO# FL2080365.

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Senior Programmer - To work on various software projects for business and/or technical systems using Windows API, OCX, OLE, DLL, COM/DCOM, MFC, and AT1. To derive detail design specifications and development schedules from high level architectural documents, and to analyze, design, develop computer software using object oriented methodology. To perform structured systems analysis; design program's software structure for the responsible portion of the project; write technical specifications; plan development schedules; review periodicals, publications, and documents; develop software using Visual C++, Visual Basic on Windows Platform; use client service databases such as Microsoft SQL Server; test and debug software; assure quality of the software; implement and integrate systems according to the systems specifications; maintain and support computer systems; and write documentation and user manuals for the developed systems. Must have a Master's degree or equivalent (BS plus five years of experience) in computer science, engineering or related field with two years of experience in the offered poistion or in programming or software development. 40 hrs/wk: $75,000/yr: 9 am to 5 pm. Send two resumes to Case # 19992112, P.O.Box 8968, Boston, MA 02114.

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BOSE Corporation, an innovative leader in consumer electronics and acoustics, has an immediate need to fill a range of SAP, EDI and Sales Systems Support positions in the Boston area.

The following positions all require a Bachelor's degree (or equivalent) in Computer Science, MIS, Business Administration, or similarly relevant field, and 2-6 years relevant experience to include the requirements described below.

PROGRAMMER-ANALYST POSITIONS

- Sap Basis Administrators (with SAP experience, involving both Oracle and HP-UX and protocols, in a production environment.)
- EDI- Sales Systems Support Programmer/Analyst (with EDI mapping and HP-UX scripting experience, in a production environment.)

Starting salaries range from $47,100 to $82,600 per year, together with two weeks annual paid vacation, medical and life insurances, and other industry-competitive benefits.

Please mail or fax your resume to: Mr. Donald Baptiste, (IMSP), Bose Corporation, Dept. 5-D-1, The Mountain, Framingham, MA 01701. Fax (508) 766-7499. Email: don.baptiste@bose.com. Visit: www.bose.com

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Design, implement Network Systems including intranet Network systems, provide Unix System Administration to Client computer systems, develop tools using Shell scripting and C language. Performance tuning of Unix and AIX operating systems and Oracle databases. Maintain system integrity, troubleshoot software & system problems in networked environment. Perform integration of AIX, Novell intraware, Windows NT & Windows operating systems. Install operating systems on servers and establish connectivity between servers. Must have Bachelor's of Computer SC./Equivalent & 6+ yrs. exp. as information technology professional in Unix administration. 2.5 + yrs. exp. in Shell Scripting, AIX, Windows NT, Network design and troubleshooting & C. 9 to 5 PM, 40 hrs. per week, $60,000 p.a., must have legal authority to work in the U.S. Send Resume attn. Som Bhattacharya, System Edge USA, LLC, 811 Seffert St., Philadelphia, PA 19128.

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Software Engineers needed immed. by Boston-area company. Design, implemt, devlp & supprt co's proprietry sftwr systems for integrated contrl of air flow for critical air-qual. envirnmts, e.g. operating rms, manufactrs' clean rms, & resch labs. Coordinate sftwr devlmt w. co's embed. sftwr team. Create & encode, using objct orientd lang., algorithms for data transctn in LAN envirnmt using netwk protocls & digital sig. processing to process digitl data frm co's proprietary digitl hrdwr. Eval. sftwr sys. archtr. Anal. & imprve sys. perfrmnce. Devel. specs for sys. integratn. Ensure compat. betw. co's sftwr systems & other sftwr systems in major buildng managmt contrl systems. Reqrd: M.S. Elec. Engnr. or Comp. Engr; plus 1 yr. pre-or-post grad. exp. in job offerd OR 1 yr. pre-or-post grad. exp. in any occ. writing & encoding algorthms for digitl signl processing & for Visual C++ apps; plus demon. expertise in theory of Comp. Systms, Sys. Anal., & Digitl Sigl Processing as may be shown by grad. course wk, pubs, or prof. perform. 40 hrs/wk, M-F, 8am-5pm. Sal. $72,460/yr. Send resume (2 copies) to: Case Number 19990808, P.O. Box 8968, Boston, MA 02114. EOE

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**PROGRAMMER-ANALYST**

F/T Position for person with BS degree in Computer Science or Information Systems and two years experience in the Computer industry with skills in **two** or more of the following areas: Mainframe/Midrange (COLBOL, CICS, AS/400), Client Server Application Development (VB, Visual C++, COAX/Optivision, Internet), SAP, UNIX, LAN/WAN, Networking/NT, Electronic Commerce/EDI, Data Architecture (SQL Server/Oracle). Job includes database changes to production & development environments; design and implement Oracle RDB Database strategy; provide Rdb and SQL server database support for industrial production and development; participate in application design reviews; redesign and re-engineer current applications and business practices. Proof of legal authority to work in US required. $62,690/yr. Job Order #GA 6495685. Report to or send 2 resumes to the nearest Georgia Dept. of Labor Field Service Office.

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SOFTWARE ENGINEER: Experience in Unix based communication software to design, implement and test Network Management modules. Strong experience in UNIX systems, TCP/IP and Networking protocols; Demonstrated ability in Unix interprocess communication and socket programming; Demonstrated ability in UNIX/AIX shell programming; Demonstrated ability in working with C, C++ in AIX/UNIX environment. Requires: MS in Comp Sci, Engg, Electronics, Math or related field plus 2 years experience in job offered and or 2 years experience in software development; Will accept BS degree or foreign equivalent degree with five years of experience as computer professional, in lieu of the req'd edu. & exp. 40 hrs/wk, 8:00 a.m. to 5:00 p.m.; $70,000/yr. Send two (2) copies of resume/ respond to: Case #19992420, PO Box 8968, Boston, MA 02114.

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Software Engineer-Design, build, maintain, and enhance company product suite. Will utilize Microsoft Windows GUI methods to capture the information necessary to generate the simulation or workflow systems, extend the behavior and representation of business models, and translate research into actual simulations and workflow systems. Requirements include a Master of Science Degree in Computer Science, Software Engineering or related field and three years of pre or post degree experience in C/C++, Windows NT, Microsoft Visual C++, COM technology, and a thorough knowledge of workflow or simulation system. Applicants must have unrestricted authorization to work in the United States. Salary $72,500/year. 40 hours/wk. Respond with two copies of resume to Case #19990922, P.O. Box 8968, Boston, MA 02114.

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Business Analyst. Software development business analysis. Deploy management information systems based on Groupware techniques. Knowledge analyzing software development business processes to create functional specifications for management information systems. Knowledge planning, structuring and administering heterogeneous computer networks for software development. Knowledge to create and develop management information systems or business applications using Groupware technology $82,202/yr. 40 hr/wk. 9 a.m. - 5 p.m. Must have Master's degree in Business Mgmt. rel. field/equiv. Send 2 resumes: Case #19992275, P.O. Box 8968, Boston, MA 02114.

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Systems Analyst (GIS) Miami, FL: Operate, maintain and enhance Geographic Information Systems (GIS) software. Data capture, acquisition, correlation and analysis using electronic instruments and computer systems. Will supervise 1 employee. Req'd Bachelor's degree in Comp. Sc., Math, Physics or Astrophysics & 1 yr of exp. in the job duties or in a related occupation in Math, Comp. Software development. Astronomy/Astrophysics. M-F 7:30 a.m.-3:30 p.m. 40 hrs/wk. $47,424/yr. Send resume to: Dept of Labor/Bureau of Workforce Program Support P.O. Box 10869, Tallahassee, Florida 32302-0869. JOFL 2080550.

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**Software Engineers**
**Clifton, NJ**

Automated Wagering International, Inc. designs and manufactures on-line lottery systems and terminals, and provides operations, marketing support and game development to lotteries. With nearly three decades of experience, AWI has built a reputation as a technological innovator and market leader.

We have multiple openings for all levels of Software Engineers.

You must possess a BA/BS in Computer Science, Engineering or related field and 0-4 years of applications development experience. Skills sought include C and Assembly.

Please submit resume and salary requirements in confidence to: Employment, AWI, 1255 Broad Street, Suite 200, Clifton, NJ 07013-4219 or fax to (973) 594-0562. Visit us on the web at: www.awii.com.

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Senior Software Engineer: Responsible for all phases of system development including Requirement Definition, Functional and Technical Design, Development, Software Testing and implementation of ERP and ECOM products. Design complex business applications using Object Oriented Methodologies, Object Request Broker and other distributed processing tools on the multi-tier cross platform environments. Implement ECOM/ERP solutions using the following technologies: VC++, MFC, JAVA, JFC, SERVLETS, COM, CORBA, JDBC, ODBC, ORACLE, SQL-Server on Windows NT and UNIX platforms. Provide leadership for enhancing and recommending solutions for existing applications, technical user and configuration documents and product technical support. Requires: advanced degree of an M.S. in Computer Science or related field or in the alternative a B.S. followed by 5 years of progressive job related experience. 40 hrs/wk (8 to 5) $75,000/yr. Send two (2) copies of resume/response to Job Order # 2000-209, P.O. Box 989, Concord, NH 03302-0989.

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Technical Specialist

**Technical Specialist I**

AAA is seeking a Technical Specialist to join our growing team in Heathrow, Florida. Candidate will identify, analyze, and define requirements, procedures, and problems and devise solutions; design, code, test, debug, and document computer programs; contribute to development through integration and maintenance of highly complex system software and databases; may instruct, direct, and check work of programming personnel. A Bachelor's degree in Computer or Engineering field is required, along with two years of experience in programming and systems analysis with proficiency in Visual C++ and Informix. For consideration, please send your resume to be received in our office by June 5, to: AAA, Human Resources, Dept. 70TS, 1000 AAA Drive, Heathrow, FL 32746-5063. Fax 407-444-7504. Check us out on the web at www.aaa.com/jobs. EOE M/F/D/V.

AAA

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Full time Senior Project Engineer to design and create GUI (Graphic User Interface) with Visual C++/MFC(Microsoft Foundation Classes)/Object-Oriented C++ programming in Windows NT. Implement and maintain GUI's functions and additional features. Create system command functions/handlers for GUI's communicating with system engine, API and database to integrate the whole project. Must have a Master's Degree in Computer Science, or related field. Educational or work background must have included object oriented programming and Visual C++ 5.0/MFC. Salary: 59,775/yr. Send resume to: Electronic Tele-Communications, Inc., 3605 Clearview Place, Atlanta, Georgia 30340, Attn: Elaine McTyre.

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Database Administrator - Berwyn, PA & various client sites Responsible for the design, implementation, testing and population of customer database. Perform data modeling, database systems architecture design as well as schema optimization and normalization. Must have: Proof of legal authority to work in US; Bachelor in Comp Sci or Engg plus 2 yrs of exp in job offered or as Programmer or Programmer Analyst or Systems Analyst (or Master with no exp); Exp. in Oracle RDBMS, PL/SQL, Pro*C. 40hrs/wk M-F 9am-5pm $67,800/yr Send resume or C.V. to The Philla. Job Bank, 444 N. 3rd St., FL., Phila, PA 19123 Job Order #7062712

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SR. SOFTWARE ENGINEER: Debugging kernel and device driver and Develop test scripts in C, SQL and shell scripts; High availability concepts, GCOS, UNIX; TCP/IP, X.25, Compilers and good analysis and implementation of OS solutions; Oracle/Sybase database knowledge, basic internet knowledge and Windows NT and C++ skill. Job duties are to maintain and enhance system software with emphasis on operating system and communication protocols. Develop and maintain Internet based software. Requires Masters or equivalent in computer science with no experience required. 40 hours per week at $73,000 per year. Please send resume to Case # 19983662, PO Box # 8968, Boston, MA 02114

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Software Engineer: Lead team in design & development of large commercial & government middleware to automate & interface hetrogeneous systems. M-F 40hrs/wk, 50K/yr. Must have BS in Systems Engineering & 5 yrs exp. as project leader for large network software development. Must be fluent in English, MS Visual C++, MFC, Windows NT, Oracle & Velosis, RDM, UNIX, SQL, Velosis, Visual Basic, PC Assembler, graphic & Internet tools. Send 2 copies of resume to Case # 19992471, P.O. Box 8968, Boston, MA 02114

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Sr. Programmer Analyst: To analyze, dsgn, dev. & implement software applns. in accordance with client specification. Modify and/or enhance sys. capabilities by using various comp. languages & skills such as ORACLE. Visual Basic, Ms-Access on UNIX & Windows env. Sal. $65K+medical benefits. Must have MS in Computer Science/Engg or BS in Comp. Sc./Engg with 5 yrs of progressive exp. Send resume to Vice President, Koni Ameri Tech Services, Inc., 5950 Live Oak Parkway, Suite 250, Norcross, GA 30093.

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Software Consultant

Design & develop Real-Time embedded systems for firmware using C or Assembly language for processor based systems. Reqs: Bach. in Electronics or Engineering & 5 yrs. exp. M-F, 9AM-5PM, 35 hrs./wk., $72,500/yr. Send 2 resumes to: Case #19992280, PO Box 8968, Boston, MA 02114.

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An international consulting firm is seeking: Programmer Analysts, Software Engineers and Database Administrators. Exp with a variety of hardware and software packages. We offer a competitive salary, commensurate rate with exp., plus a comprehensive benefit package, including 401K, health, dental and education assistance / reimbursement. Send resume to: Primesoft, LLC, One Lawson Lane, Burlington, VT 05401 Tel: 802-658-7600 /Fax: 802-658-1090 Email: Recruiting@primesoftgroup.com

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Software Engineers - Several senior and entry-level positions available for qualified candidates possessing a BS/MS or equivalent and relevant experience. Work with Java, Oracle, Unix, C, and C++. Must be willing to travel and relocate as required. If interested, please send resume to Patel Consultants Corporation, 1525 Morris Avenue, Union, NJ 07083, ATTN: Human Resources.

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Senior Programmer/Analyst sought by company in Denver, CO specializing in business software solutions to work in Denver & other unanticipated job sites in the US. At a senior level, engage in development of computer software applications or modules &/or the tools used to develop such applications or modules & which operate on Windows NT, IBM AS/400 or UNIX platforms. Analyze requirements. Create designs & design documentation. Code, test, de-bug the software applications or modules. Use programming language C in the design & development process. Mentor other programmer/analysts. Requires Master's in comp. sci. or related field; working knowledge of software application development of using programming language C. 8am-5pm, M-F; $60,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order #CO4659261.

Programmer Analyst. Sought by Englewood Colorado consulting company to work in various unanticipated locations throughout the U.S. Work under close supervision and work is closely monitored; plan, design and develop web applications and supporting software for various clients; confer with representatives of advertising agencies; product managers and corporate advertising staff to establish media goals, and design specific computer applications to meet those goals. Confer with advertising agents or media representatives to select specific programs to ensure optimum use of budgeted funds and long-term contracts. Use of web technologies including HTML, ASP, VBscript, JavaScript. Reqs. Bachelor's Computer Science, Computer Engineering, Marketing or related field of study. $44,200/year, 40/hrs/wk, 8:00AM-5PM. Respond by resume to James Shimada, Colorado Department of Labor & Employment, Tower II, #400, 1515 Arapahoe St., Denver, CO 80202 and refer to Job Order No. CO 4659512.

Programmer/Analyst

Wanted by Internet Service Provider in Westmont, IL. Must have MS in Comp Science & 1 year software experience.

Respond to: HR Dept, Allways, Inc., 98 East Naperville Rd, Ste 203, Westmont, IL 60559.

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ORACLE DATABASE ADMINISTRATOR to design, develop, code, test, implement, coordinate and maintain logical and physical computer databases and software for various business management and financial applications; Analyze, design, develop and implement application systems in an Oracle environment; Install Oracle software and create databases on other non-production servers; Prepare systems and user documents; Perform stated duties using Oracle, Oracle RDBMS, SQL, SQL*Plus, CGI, Perl and Pro*C on Windows NT and UNIX platforms. Require: Bachelor's (or foreign degree equivalent) in Engineering, Computer Science or closely related field, with 6 months of experience in the job offered or in Oracle database administration. Salary: $70,000 per year, 8 am to 5 pm, M-F. Send resume to Kathryn Huseman, General Counsel, Knowledge Workers, Inc., 391 Inverness Drive South, Ste 300, Englewood, CO 80112, ATTN: Job SK.

Programmer Analyst. Sought by Englewood Colorado consulting company to work in various unanticipated locations throughout the U.S. Analyze, plan, develop, test, and document computer programs. Implement and administer wide area networks over a Frame relay circuit; evaluate user requests and software program requirements for new and modified programs. Write specifications, code, test and debug computer programs. Customize hardware and software to client needs. Use of Novell Netware, Microsoft NT, DOS, and IBM Computers. Reqs. Bachelor's Computer Science, Electrical Engineer, Computer Engineering or related field of study. Plus 2 years in the job offered or 2 years in a related occupation including Systems Analyst or Programmer Analyst. Will accept a combination of experience and education equivalent to a Bachelor's degree in lieu of the required education and experience. $61,900/year, 40/hrs/wk, 8:30AM-5PM. Respond by resume to James Shimada, Colorado Department of Labor & Employment, Tower II, #400, 1515 Arapahoe St., Denver, CO 80202 and refer to Job Order No. CO 4659510.

Software Development Engineer

Designs and develops software for domestic and international publishing industry, Internet applications and/or relational database management systems in a client/server environment. Provides functional analysis related to design, development and implementation of software or multiple platforms using C/C++ programming languages. Codes, test and debugs the applications, modules and/or graphic features. Requires B.S. or foreign equivalent or equivalent work experiences and training in computer science, engineering or related field. Multiple positions available. 13 at $40,000/year. 11 at $62,000/year requiring 2 years experience in job offered or 2 years as software engineer or programmer with C/C++ programming experience. Location of job, Denver, Colorado. 40 hr. week. Application by resume only. Submit two (2) copies of resume to Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117 and refer to job order number C04658170.

Programmer Analyst (2 Positions)-Plans, develop, tests and documents computer programs, applying knowledge of programming techniques and computer systems. Will code, maintain and modify programs. Requires Bachelor in Computer Science, Electrical or Electronic Engineering or Mathematics. Requires 2 yrs experience in job offered or 2 yrs experience as Systems Analyst, Software Engineer or Programmer Analyst. Must have 1 yr experience in PeopleSoft. 5 day, 40 hr/wk, $63,000/yr. Please mail resumes to Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117 and refer to order number CO4659041.

Senior Programmer/Analyst sought by company in Denver, CO specializing in business software solutions to work in Denver & other unanticipated job sites in the US. Design & develop manufacturing software applications which run on AS/400 &/or incorporate client/server architecture, & interface with relational database management systems &/or the tools used to create such applications. Analyze user requirements. Create designs & design documentation. Code, test, & de-bug the software applications. Use RPG/400, SQL/400, programming language C& SQL in the design & development process. Requires Bachelor's or foreign equivalent in comp. sci. or related field (incl. elec. eng. or comp eng.); 2 yrs. in the design & development of manufacturing software applications on the AS/400 platform. 8am-5pm, M-F; $60,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order #CO4659269.

**Associate Technical Consultant - Back-End Development**

Responsible for coding of COBOL, JCL, SOL and VSAM applications in an IBM mainframe environment using DB2 and following predefined software designs and specifications. Responsible for unit and system testing of application modules and components and verifying the accuracy and integrity of the results. Also responsible for creating test plans, process flows, operational procedures and other documentation pertaining to coding, testing, and installing stages of the software development lifecycle and communicating status to team members and management. Minimum education: Bachelor's degree or its equivalent in computer science, physics or any math, electronics, engineering or science field. Other special requirements: Knowledge of COBOL, JCL, DB2 and VSAM.

Your contributions to our industry leadership will be rewarded with excellent compensation, comprehensive benefits, and ongoing opportunities for professional growth and development. Electronic resumes, in ASCII format only, are preferred and may be sent to: hireme@amdocs.com. No file attachments please. Or mail or fax to: Amdocs, Attn: Recruitment Manager, 2109 Fox Drive, Champaign, IL 61820. Fax: (217) 355-4699.

**Technical Consultant/Developer**

Responsible for the analysis, design, development and maintenance of key software applications using C++ and C under the UNIX development environment. Also responsible for analysis of customer requirements and product functional capabilities, integration of new code with legacy systems, writing new code in C++/C utilizing third-party software products, and working with technical writing staff to document product functionality. Also involved in installation and maintenance of the software applications at customer sites. Minimum education: Bachelor's degree or its equivalent in computer science, physics or any math, electronics, engineering or science field. At least two years of experience as a Programmer Analyst or Software Developer. Other special requirements: Experience to include the following: Developing and testing software in a commercial environment using UNIX, C++ and C and writing new code in C and C++.

Your contributions to our industry leadership will be rewarded with excellent compensation, comprehensive benefits, and ongoing opportunities for professional growth and development. Electronic resumes, in ASCII format only, are preferred and may be sent to: hireme@amdocs.com. No file attachments please. Or mail or fax to: Amdocs, Attn: Recruitment Manager, 2109 Fox Drive, Champaign, IL 61820. Fax: (217) 355-4699.

**Senior Technical Consultant - Back-End Development**

Responsible for the construction phase of the SDLC, consisting of coding in COBOL, JCL, DB2 and VSAM, code reviewing, unit testing, acceptance testing, and implementation tasks, as well as some light detailed designing, and producing requisite design deliverables per the SDLC in a commercial environment. Also responsible for the execution of some standard baseline/regression or client tests, also in a commercial environment, following documented test procedures. Minimum education, training, and experience: Bachelor's Degree or its equivalent in computer science, physics or any math, electronics, engineering or science field. Three years of experience as a Programmer Analyst/Software Developer. Other special requirements: Experience to include the following: Developing and testing software in commercial environment using COBOL, JCL, DB2 and VSAM.

Your contributions to our industry leadership will be rewarded with excellent compensation, comprehensive benefits, and ongoing opportunities for professional growth and development. Electronic resumes, in ASCII format only, are preferred and may be sent to: hireme@amdocs.com. No file attachments please. Or mail or fax to: Amdocs, Attn: Recruitment Manager, 2109 Fox Drive, Champaign, IL 61820. Fax: (217) 355-4699.

**SOFTWARE ENGINEERS**
**IT PROJECT ENGINEERS**
**SYSTEMS ANALYSTS**
MFC, ODBC, Visual Basic, GUI, Shell Scripts, C++, Visual C++, MS SOL Server, Silverstream, Java, Java Script. Require BSCS/EE or MSCS/EE, plus 0-3 years experience.

**PROGRAMMER ANALYSTS**
**DATABASE ADMINISTRATORS**
**NETWORK ADMINISTRATORS**
Oracle Financials, Sybase, SOL server, ERP, SAP, RDBMS. UNIX and SYBASE DBA, LAN, WAN. Require BSCS, BS in Engineering, MIS, Computer Applications or higher, plus 0-3 years experience.

**MANAGEMENT ANALYSTS**
**FINANCIAL ANALYSTS**
JD Edwards Financials, Sybase, ERP, CRM, SAP, RDBMS. BS in Engineering, MIS, Computer Applications or higher, plus 0-3 years experience.

Multiple positions located at our various facilities in Austin, Dallas, Houston, Plano and San Antonio, TX; Chicago, IL; San Francisco and Sacramento, CA; Boston, MA; Miami, FL ; Atlanta, GA; and Tulsa, OK.

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**Technical Consultant - Back-End Development**

Responsible for the construction phase of the SDLC, consisting of coding in COBOL, JCL, DB2 and VSAM, code reviewing, unit testing, acceptance testing, and implementation tasks, as well as some light detailed designing, and producing requisite design deliverables per the SDLC in a commercial environment. Also responsible for the execution of some standard baseline/regression or client tests, also in a commercial environment, following documented test procedures. Minimum education, training, and experience: Bachelor's Degree or its equivalent in computer science, physics or any math, electronics, engineering or science field. Two years of experience as a Programmer Analyst/Software Developer. Other special requirements: Experience to include the following: Developing and testing software in commercial environment using COBOL, JCL, DB2 and VSAM.

Your contributions to our industry leadership will be rewarded with excellent compensation, comprehensive benefits, and ongoing opportunities for professional growth and development. Electronic resumes, in ASCII format only, are preferred and may be sent to: hireme@amdocs.com. No file attachments please. Or mail or fax to: Amdocs, Attn: Recruitment Manager, 2109 Fox Drive, Champaign, IL 61820. Fax: (217) 355-4699.

**Senior Software Project Engineer - Embedded**

**Mortara Instrument, Inc.** is a leader in the design, development and a manufacturer of diagnostic ECG equipment. We develop innovative high-performance medical equipment encompassing the latest technologies for sale around the globe. Due to our planned growth, we have two openings for individuals that meet the following requirements. Must have a minimum of 5 years product development experience. A Bachelors Degree in computer engineering, computer science, or related field. This candidate must also have three years C Language experience, and two years real time, Embedded experience.
Mortara presents the opportunity to work in a small company environment offering competitive salaries and benefits that rival a large company, including health, dental and disability insurance as well as a company participatory 401K Plan.
If you would like more information on this position, please contact: **Bob Pierdzioch, Mortara Instrument, Inc., 7865 North 86th St. Milwaukee, WI 53224. Phone (414) 354-1600, Fax (414) 354-1439, or email to bobp@mortara.com**

Programmer/Analyst
In-house title: Senior Staff Analyst
Multiple Positions: 25

Monday through Friday; 8 a.m. to 5 p.m., $42,089 to $65,000 annually. Required is a BS or BA or its equivalent in Computer Science, Engineering, Math, Physics, or Business and one (1) year of experience in the job being offered or one (1) year of related experience as a Programmer and/or Systems Analyst. As equivalent to baccalaureate degree, employer will accept three (3) years of programming and/or systems analyst experience for each year of formal academic training lacking. Related experience presupposes one (1) year of experience in one or more operating systems; one or more programming languages as well as data bases; and PC or Unix computers. IBM AS/400-specific experience, AS/400 COBOL or RPG as well as CL, subfiles, SEU, SDA, and DDS are required. PC experience requires SOL databases and language mix from Access, Powerbuilder, VB, C++, Java, SOL, or Oracle. In one or more environments involving large systems, mid-range systems or PCS with client-server, uses principles of computer science to analyze data flow for design of business-oriented information systems and for design and writing of the application program for the system. Via the use of databases and applications programs defines and creates data structures for storage of the subjects of master files and associated transaction files that incorporate data entry, updating, query and report processing. Implements testing. Formulates manual procedures to document how data is obtained for input and how the system's output is distributed. Formulates machine procedures to instruct the computer on how to perform batch processing activities as well as interactive, realtime processing of daily transactions. In conjunction with customer-dictated design requirements, provides enhancements for new or existent applications. Must have proof of legal authority to work permanently in the United States.

Applicants submit two (2) resumes with reference to case numbers C101530 - C101532 to:

Mike Brooks
DWE-ALC
P.O. Box 7972
Madison, WI 53707-7972

Programmer/Analyst - Plans, develops, tests computer programs, applying knowledge of programming techniques and computer systems. Evaluates user request for new or modified programs. Consults with user to identify current operating procedures and clarify program objectives. Reads manuals, periodicals and technical reports to learn of ways to develop programs that meet the user requirements. Formulates plan outlining steps required to develop programs, using structured analysis and design. Submits plans to user for approval. Prepares flowcharts and diagrams to illustrate sequence of steps programs must follow and to describe logical operations involved. Designs computer terminal screen displays to accomplish goals of user request into sequence of detailed instructions and logical steps for applying knowledge of computer program techniques and computer languages. Enters program codes into computer system. Replaces, deletes, or modifies codes to correct errors. Analyzes, reviews, and alters programs to increase operating efficiency or adapt to new requirements. Assists users to solve operating problems. May install and test programs at user site. 40 hours per week; 12:00 a.m. to 9 a.m.; two years of experience; four years of high school and 4 years of college with a B.S. degree in electronics; $56,554 per year. Must speak, read and write the Polish language. Must have proof of legal authority to work permanently in the U.S. Job located in Chicago. Send resumes to Illinois Department of Employment Security, 401 South State Street - 7 North, Chicago, Illinois, 60605. Attention: Shella Lindsay, reference #V-IL-21907-L. An employer paid ad, no calls - Send 2 copies of both resume and cover letter.

**Front End TSI Development - Developer 2**

Responsible for assisting in the future direction of the Company's products. Works in a team of developers to help guide and determine the work required for enhancements, bug fixes, etc. for the TSI Vision and MD products. Assists team with on-time delivery of the products to the company and its customers. Works with the development staff and manager to develop project plans for each new release or patch of the product. Participates in internal and customer meetings where necessary for the gathering of requirements and the distribution of information. Assists with functional designs, design reviews, coding, shell scripting, testing and documentation of the products. Works with complete Synchronous Data Link Control (SDLC) in an object-oriented environment, with C++ on a UNIX platform, with Unified Modeling Language (UML), and with networking and communication methods (i.e., TCP/IP and asynchronous programming). Minimum education: Bachelors degree or its equivalent in computer science, physics or any math, electronics, engineering or science field. Two years of experience as a Programmer Analyst/Software Developer. Other special requirements: Experience to include shell scripting and developing and testing software in commercial environment using: Complete SDLC in an object-oriented environment; C++ on a UNIX platform: UML; and networking and communication methods (i.e., TCP/IP and asynchronous programming).

Your contributions to our industry leadership will be rewarded with excellent compensation, comprehensive benefits, and ongoing opportunities for professional growth and development. Electronic resumes, in ASCII format only, are preferred and may be sent to: hireme@amdocs.com. No file attachments please. Or mail or fax to: Amdocs, Attn: Recruitment Manager, 2109 Fox Drive, Champaign, IL 61820. Fax: (217) 355-4699.

Systems Analysts-Multiple positions

Responsibilities. Analyzes users requirements, procedures, and problems to improve existing computer system. Confer with the client/server quality assurance team in analyzing software from product inception to release. Help develop and execute test plans and test procedures. Recommend corrective actions. Analyze and report test standards, procedures and results and maintain quality standards using UNIX, Oracle, SQL Server, CORBA, DCOM or UML and

Responsibilities: Analyzes users requirements, procedures, and problems to produce ecommerce product with effective strategies for development, marketing, sales and support. Analyzes test data and designs methods and procedures for obtaining data. Conducts studies pertaining to development of programs to increase sales, monitor lead generation and tracking and develop and maintain customer contacts.

B.S. or foreign degree equivalent in computer science, engineering or related field; 1 year experience in job offered or 1 year as quality assurance engineer or software engineer with experience in C/C++ programming. $54,000/year. Location of job, Denver, Colorado. 40 hr. week. Application by resume only. Submit two (2) copies of resume to Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117 and refer to job order number C04658157.

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Member of Technical Staff. Duties: Provide strategic/technical assistance to the business and service units of telecommunications company. Use knowledge of voice systems including those of AT&T and Siemens, and network technologies including Ethernet, Token Ring, TCP/IP, NICs, hubs, bridges, switches, routers, Frame Relay, ATM, Windows NT and Novell Netware to perform technology/competitive intelligence, Assess new technologies & relate them to business/service opportunities. Translate technology impacts to both technical and non-technical audiences. Develop conceptual ideas on new products by leading ideation sessions or otherwise. Analyze technical and/or service feasibility of new product/service concepts, and subsequently develop proof-of-concept scenarios and prototypes for those concepts; utilize vendor management skills and industry knowledge to evaluate vendors and their platforms/products, in order to aid the business in bringing a concept to product deployment. Use project management skills to develop and track project plans, and/or assist with financial management of other specific projects. Requires: B.S. Computer Science or related, plus working knowledge and/or coursework in the following: (1) Performance of technology intelligence and assessments (2) Ethernet, Token Ring, TCP/IP, NICs (3) Hubs, bridges, switches, routers, Frame Relay & ATM (4) Windows NT, Novell Netware (5) AT&T and Siemens voice systems. Location: Boulder, CO. Working Conditions: M-F 8a.m.-5p.m. Salary: $59,900/yr. Reply by resume only to Colorado Department of Labor & Employment, Employment Programs, Attn: Jim Shimada, Tower 2, Suite 400, Arapahoe Street, Denver, CO 80202-2117 and refer to job order number: CO4657965.

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Senior Software Consultant sought by company in Denver, CO specializing in business software solutions to work in Costa Mesa, CA & other unanticipated job sites in the US. At a senior level, implement client/server manufacturing enterprise resource planning software applications. Analyze manufacturing processes used by the client company & create specifications for customized manufacturing ERP software applications. Implement & install the software applications & customize, enhance, & modify the applications to be consistent with the client's manufacturing processes. Engage in the re-engineering of those processes to increase the efficiency of the software applications. Trouble shoot & resolve any problems or bugs. Provide technical support of other Software Consultants. Requires Master's or equivalent-specifically, requires a Master's degree (or foreign equivalent) in comp. sci., eng., or related field (incl. ind. eng. or eng.(prod.))+ 3 years of progressively more responsible manufacturing &/or software experience; or, a Bachelor's degree (or foreign equivalent) in comp. sci., eng., or related field (incl. ind. eng., or eng.(prod.) + 5 years of progressively more responsible manufacturing &/or software experience; Working knowledge of implementing & customizing manufacturing ERP software applications. 8am-5pm, M-F; $68,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, CO 80202, & refer to Job Order #CO4659274

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Team Leader sought by company in Denver, Co specializing in business software solutions to work in Norwalk, CT & other unanticipated job sites in the US. Lead a team of technical consultants who are involved in implementing, integrating, & customizing client/server enterprise resource planning software applications, including acting as a Project Leader. The software applications run on Windows NT & UNIX platforms, & interface with different relational database management systems, including Oracle, Sybase, & SQL Server. Engage in business process re-engineering & plan direction of future releases. Assign tasks & provide technical direction & support to Technical Consultants & Senior Technical Consultants who create designs & design documentation, & code, test, & de-bug the software customizations. Use Shell Script, Perl Script, & TCL Script in designing, & developing the customizations. Work with research & development to customize core software applications. Requires Master's in comp. sci., eng., or related field (incl. ind'l eng.); 1 yr. as a technical consultant implementing & customizing enterprise resource planning software applications that run on Windows NT & UNIX platforms, & interface with relational database management systems. 8am-5pm, M-F; $60,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order #CO4659311.

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Senior Consultant sought by company in Denver, CO specializing in business software solutions to work in Beaverton, OR & other unanticipated job sites in the US. Implement client/server manufacturing enterprise resource planning (ERP) software applications & modules. Design & develop modified & customized client/server manufacturing ERP software applications. Engage in extensive testing of the manufacturing software applications, & problem solve & trouble shoot any bugs or issues. Analyze business processes to make sure the software applications & modules are consistent with those business processes. Use business modeling tools to link software applications & modules with existing business processes. Requires Master's or equivalent-Specifically, a Master's (or foreign equivalent) in computer science, engineering, or a related field (including mechanical engineering)+three years of progressive experience in manufacturing &/or software development, or a Bachelor's (or foreign equivalent in computer science, engineering, or a related field (including mechanical engineering)+ five years of progressive experience in manufacturing &/or software development; Working knowledge in the design, development, & implementation of client/server manufacturing ERP software applications. 8am-5pm, M-F; $88,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order # CO4659293.

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Sr. Software Testing Engineer sought by computer consulting company in Greenwood Village, CO, to work in Greenwood Village, & other unanticipated job sites in the U.S., to, at a senior level, conduct testing, configuration management, verification & validation, & quality assurance of new or updated software applications for client/server products. Create, implement, & maintain test plans, test design documents for products & software. Create automated test cases using automated testing tools & product test result reports. Monitor the reported bugs, work with the development team to determine schedule for resolution, retest & resolve the bugs/defects. Participate in product requirement & system requirement specification reviews. Provide LOE & schedule for testing efforts. Engage in version controlling & bug reporting using Continuous/RCS/CVS/PCRM/Gnats/DDTS tools. Participate in formulization & implementation of SEI/CMM key process areas to assure certain 'maturity' level of standardization, & also engage in external & internal quality audits, generation of audit reports, minutes & action items. Requires Master's or equivalent in Computer Science or related field. Specifically, the position requires a Master's or foreign degree equivalent, plus 3 yrs of progressive experience in the software field, or a Bachelor's, or foreign degree equivalent, plus 5 yrs of progressive experience in the software field. Working knowledge of creating automated test cases, configuration management tools, & implementing SEI/CMM key process areas. $66, 100/yr; M-F; 8am-5pm. Respond by resume to James Shimada, CO Department of Labor & Employment, Tower II, #400, 1515 Arapahoe St., Denver, CO 80202, & refer to Job Order No. CO4659237.

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- Software Design Engineer
- Product Marketing Engineer/Product Manager
- Member of IT Technical Staff
- Information Technology Specialist

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hp is an equal opportunity employer dedicated to affirmative action and work force diversity.

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Senior Technical Consultant sought by company in Boulder, Co to work in Boulder & other unanticipated job sites in the U.S. At a senior level & for a computer consulting company specializing in providing business solutions to middle market clients & that has been selected as an SAP National Implementation Partner, use Oracle-based Tier One ERP (Enterprise Resource Planning) systems to provide clients with a thorough business needs analysis, product configuration, connectivity & requirement definition, documentation, & identify & recommend areas for procedural change. Install & configure multiple versions of UNIX & NT operating systems, Oracle &/or SQL/Server RDBMS; install and configure complete SAP R/3 systems & landscapes. Give internal and external training on SAP R/3 support & installation. Provide tuning services & install add-on products such as Crystal Reports. Set up & maintain the security & transport systems as well as back up & recover processes. Requires Master's or foreign equivalent in computer science or related field (incl. Computer applications); 2yrs. exp. programming in a Tier One Oracle-based ERP system. 8am-5pm, M-F; $78,000/yr.(4 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400,1515 Arapahoe, Denver, CO 80202, & refer to Job Order #CO4659582.

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Software Engineer sought by company in Lakewood, CO that is a non-bank provider of customer money transfer & other financial services to work in Lakewood & other unanticipated job sites in the US. Design & develop software to facilitate consumer money wire transfers. Using UML & object-oriented analysis, interface with the users to determine requirements & develop an object-oriented design. Implement the design using object-oriented programming, Java & Swing on the NT operating system for a multi-tier client/server environment. Responsibilities include developing software design, implementing designs as code, testing software implementation, maintenance enhancements & troubleshooting. Requires Bachelor's or foreign equivalent in comp. sci., eng., or related field (incl. civil eng. w/coursework in comp. sci.); 4 yrs. exp. as a software engineer, w/at least 2 yrs using object oriented analysis, design & programming, & at least 2 yrs. using Java, working knowl of UML (Unified Modeling Language) & Swing. 8am-5pm, M-F; $75,000/yr. Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, TowerII, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order #CO4658916.

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Senior Technical Consultant (Operations Research Analyst) sought by company in Denver, CO specializing in business software solutions to work in Norwalk, CT & other unanticipated job sites in the US. At a senior level, implement, integrate, & customize client/server enterprise resource planning software applications, including acting as a project leader. The software applications run on Windows NT & UNIX platforms & interface with different relational database management systems, including Oracle, Sybase, & SQL/Server. Engage in business process modeling, optimization & re-engineering. Create software designs & design documentation, & work with software engineers to customize & implement core software applications & plan direction of future releases. Requires Bachelor's in comp. sci., eng., or related field (incl. operations research); 1 yr. as a technical consultant implementing & customizing software applications that run on Windows NT & UNIX platforms, & interface with relational database management systems, & engaging in business process modeling, optimization & re-engineering. 8am-5pm, M-F; $66,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order # CO4659265.

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Senior Technical Consultant sought by company in Denver, CO specializing in business software solutions to work in Atlanta, GA & other unanticipated job sites in the US. At a senior level, implement, integrate, & customize client/server enterprise resource planning software applications, including acting as a project leader. The software applications run on Windows NT & UNIX platforms, & interface with different relational database management systems, including Oracle, Sybase, & SQL/Server. Engage in business process re-engineering. Create designs & design documentation, & code, test, & de-bug the software customizations. Use Shell Script, Perl Script, & TCL Script in designing & developing the customizations. Work with research & development to customize core software applications. Plan direction of future releases. Requires Bachelor's in comp. sci., eng. or related field (incl. ind'l eng./mgt.eng.); 2 yrs. as a technical consultant implementing & customizing software applications that run on Windows NT & UNIX platforms, & interface with relational database management systems. 8am-5pm, M-F; $73,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, # 400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order #CO4659300

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STAFF CONSULTANT. Houston area company with 16 branch offices located throughout the U.S. which provides computer software consulting services seeks Staff Consultant. This job pays $61,000.00 per year with no overtime. The job requires the employee to perform computer systems analysis and software development including analysis, design, development, and implementation of programs for computer-based information systems in the capacity of a computer programmer-analyst; evaluate program needs of users to determine feasibility, costs, and time required; consult with users to identify operating procedures and program objectives; formulate a plan and outline steps required to develop program, using structured analysis and design; convert specifications into instructions and logical steps for coding, applying knowledge of programming techniques and languages; enter program codes into computer system; and, run and test program for logic and syntax errors to correct code. Requires a Bachelor's Degree in Computer Science and 1.5 years of experience as a Staff Consultant. Acceptable alternative Bachelor's Degrees include majors in Applied Mathematics, Applied Science, Information Systems, Engineering, Business Administration or Computer Technology, and 1.5 years of experience as a Programmer-Analyst, Staff Consultant, Junior Staff Consultant, or combination. The area of employment is Colorado Springs, Colorado. Application is by resume only. Must have proof of legal authority to work in the U.S. Mail resumes to: Colorado Department of Labor and Employment, Employment Programs, ATTN: Jim Shimada, Two Park Central, Suite 400, 1515 Arapahoe Street, Denver, CO 80202-2117, and refer to order number CO4659039. Ad Paid by An Equal Opportunity Employer.

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Consultants - Several senior and entry-level positions available for candidates possessing a MS/BS or equivalent. Work with SQL, Visual Basic, Web (HTML, Java) and TCP/IP. Must be willing to travel and relocate as required. Send resume to Perspectus, Inc., 3240 Lyon Street, San Francisco, CA 94123.

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**Implementation Consultant**

Management Reports, Inc., the preferred provider of Real Estate asset and property management software, currently has an opening for an Implementation Consultant, working in various California locations.

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- Developing implementation strategies and coordinating associated tasks and resources required to successfully implement MRI's products and services.
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- Provide training and a variety of related end-user services.

Requirements:

- Strong technical background with a working knowledge of Microsoft Access and SQL Server.
- Strong accounting knowledge or work experience.
- Experience with high-end business applications software, preferably accounting and/or real estate related.
- Working knowledge of real estate industry.

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**Management Reports, Inc.**

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Senior Programmer/Analyst sought by company in Denver, CO specializing in business software solutions to work in Denver & other unanticipated job sites in the US. At a senior level, engage in full life-cycle development of computer software applications that run on IBM AS/400 platform using the programming language RPG/400. Analyze requirements. Create design & design documentation. Code, test, & de-bug the software applications. Mentor other programmer/analysts. Requires Master's or foreign equivalent in comp. sci. or related field (incl. mathematics); Working knowledge of designing & developing computer software applications that run on IBM AS/400 platform using programming languages RPG/400. 8am-5pm, M-F; $60,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order #CO4659301

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Systems Engineer sought by company in Louisville, CO that manufactures computing storage devices to work in Louisville & other unanticipated sites in the US. Provide worldwide systems engineering support, primarily in a pre-sales context, for capacity planning & performance tuning of hierarchical disk & tape storage devices & their applications. Develop benchmarks & advise clients on hardware, software, & applications in an MVS environment. Assist in the development of & use analytical software tools to analyze the technical needs of clients & to design & develop large storage systems for mainframe computers. Write white papers for customers & other employees in the field of new technologies & products. Also assist in the identification & solution for post-sale problems. Requires 2 yrs. as a systems engineer involved in setting benchmarks & in capacity planning & performance tuning in the MVS environment within a tape & disk storage hierarchy. 8am-5pm, M-F; $63, 435/yr. Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order #CO4659505

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Programmer/Analyst sought by company in Denver, CO specializing in business software solutions to work in Denver & other unanticipated job sites in the US. Under close supervision, engage in moderately complex tasks regarding the design & development of client/server software applications that interface a variety of relational database management systems. Analyze requirements. Create designs & design documentation. Code, test, de-bug & implement the software applications. Use proprietary case tools & programming language C in the design & development process. Requires Bachelor's in comp. sci. or related field (incl. bus. admin. W/emph. in MIS); Working knowledge of design, development, coding, testing, de-bugging & implementing of client/server software applications that interface with relational database management systems (working knowledge may be gained through employment or in an academic setting). 8am-5pm, M-F; $46,500/yr. (2 openings) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, # 400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order #CO4659306

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Software Engineer sought by company in Farmington Hills, MI that develops software & provides professional services to work in Colorado Springs, CO & other locations in CO. Engaged in full life cycle software development. Develop custom software applications which incorporate client/server architecture & Oracle relational database management systems, & run on Windows NT Operating Systems. Analyze requirements. Create designs & design documentation. Code, test & debug the software applications. Train users & troubleshoot as needed. Use Visual Basic, C++, SQL Server, ASP & Com/D-Com in the design & development process. Requires Bachelor's or foreign equivalent in comp. sci. or eng. (incl. mech'l eng.); 2 yrs developing software for Windows operating systems including utilizing Visual Basic, C++ & SQL Server; Working knowledge of Oracle relational database management systems & Com/D-Com. 8am-5pm, M-F; $68,000/yr. (2 openings.) Respond by resume to James Shimada, Colorado Department of Labor & Employment, Employment & Training Division, Tower II, #400, 1515 Arapahoe, Denver, CO 80202, & refer to Job Order Number CO4659675.

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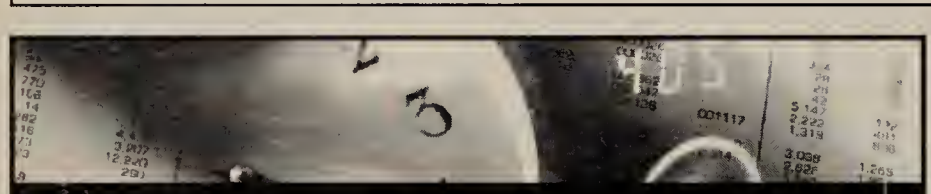

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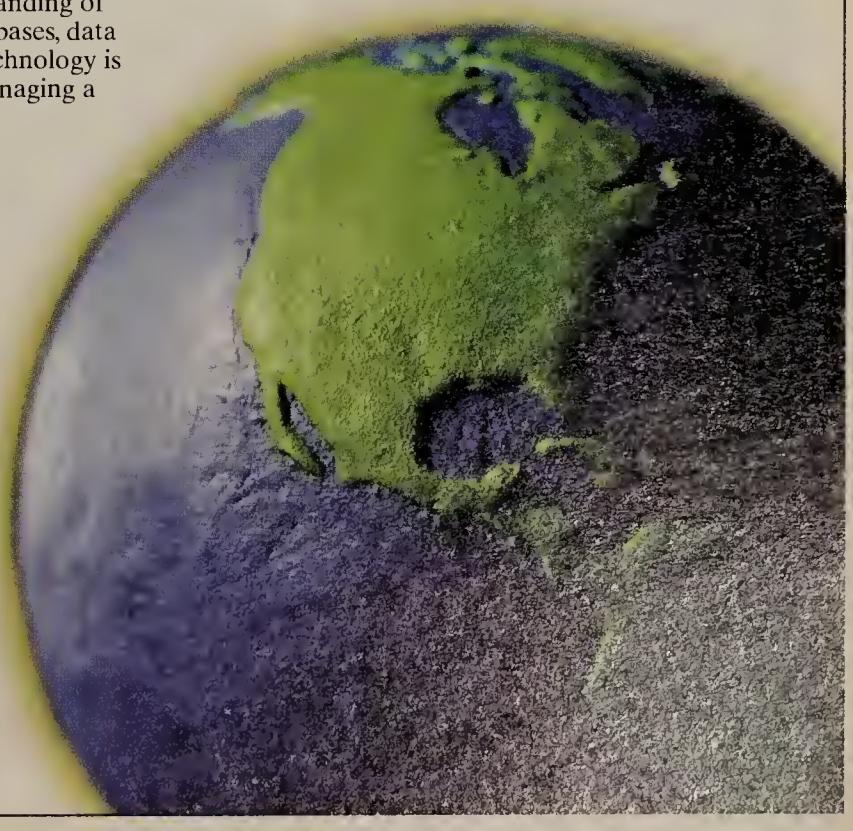

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## EDITORIAL INDEX


A
Active Software .....42
Aprisma .....37
ArrowPoint .....26
AT&T .....31
Axent Technologies .....8
B
BMC Software .....37
C
Cabletron .....8
CacheFlow .....12
Cisco .....14,26,59
ComponentSource.com .....1
Computer Associates .....37
Concord Communications .....12
E
EarthLink .....31
Exodus .....12
F
Fireclick .....38
Flashline.com .....1
G
GoTo.com .....8
GTE .....31
H
Hewlett-Packard .....37
I
IBM .....8
Impress Software .....41
INM .....10
M
Marconi .....17
Microsoft .....1,17,20,84,85
N
New ICO .....31
Nortel Networks .....17
Novell .....1,8,17
O
OnDisplay .....42
P
Packeteer .....20
Palm .....63
R
RealNetworks .....85
S
Sierra Atlantic .....37
SkillsVillage.com .....86
Sun .....8
Sun-Netscape Alliance .....37
T
TalkingNets .....31
Textware Solutions .....63
Tivoli .....37
V
VA Linux .....20
Veritas Software .....20
Vignette .....42
Viquity .....37
W
WebMethods .....42


## ADVERTISER INDEX


| Advertiser | Page # | URL |
|---|---|---|
| Adero | 22-23 | www.adero.com |
| Adtran | 87 | www.adtran.com |
| Black Box Corp | 67 | www.blackbox.com |
| Castle Rock Computing | 66 | www.castlerock.com |
| Cisco Systems | 30 | www.cisco.com |
| Citrix | 35 | www.citrix.com |
| Compaq Computer Corp | 18-19 | www.compaq.com |
| Computer Associates | 8B | www.cai.com |
| Concord | 11 | www.concord.com |
| CrossTec Corp | 43 | www.crossteccorp.com |
| Cymerc | 32 | www.cymerc.com |
| Dataprobe Inc | 66 | www.dataprobe.com |
| *Dell Computer Corp | 44-45 | www.dellhost.com |
| Digital Island | 15 | www.digitalisland.net |
| E-Comms Inc | 70 | www.e-comms.com |
| Electric Lightwave | 24-25 | www.eli.net |
| Exabyte Corp | 40-41 | www.m2wins.com |
| Fluke Corp | 2-3 | www.fluke.com |
| Foundry Networks | 36 | www.foundrynetworks.com |
| General Datacomm | 34 | www.frameprobe.com |
| GFi Fax & Voice | 72 | www.gfi.com |
| Global Technology Associates | 66 | www.gnatbox.com |
| *GTE | 46 | www.gte.com |
| Hitachi Data Systems | 29 | www.5.hds.com |
| IBM | 9 | www.ibm.com |
| Intel Corp | 13 | www.intel.com |
| Intermedia Communications | 6 | www.intermedia.com |
| Internet Security Systems | 48 | www.iss.net |
| IT World.com | 64 | www.ITworld.com |
| Lancast | 57 | www.lancast.com |
| Micron Electronics | 69 | www.hostpro.net |
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| Network Ice | 16 | www.networkice.com |
| Network Instruments | 71 | www.networkinstruments.com |
| Nortel Networks | 4 | www.nortelnetworks.com |
| PowerQuest Corp | 26 | www.powerquest.com |
| Raritan Computer | 66 | www.raritan.com |
| Resilience Corp | 39 | www.resilience.com |
| Rose Electronics | 6B | www.rosel.com |
| SAMW Inc | 71 | www.samw.com |
| SBC Communications Inc | 5B | www.sbc.com |
| SilCom Manufacturing | 70 | www.silcomtech.com |
| Sitara Networks | 49 | www.sitaranetworks.com |
| Siterock | 33 | www.siterock.com |
| Sun Microsystems Inc | 10, 42, 85 | www.sun.com |
| UUNET | 21 | www.us.uu.net |
| Verilink Corp | 63 | www.verilink.com |
| Veritas | 27 | www.veritas.com |
| Visual Networks Inc | 55 | www.visualnetworks.com |
| V-SPAN Inc | 70 | www.vspan.com |
| Western Telematic | 6B | www.wti.com |


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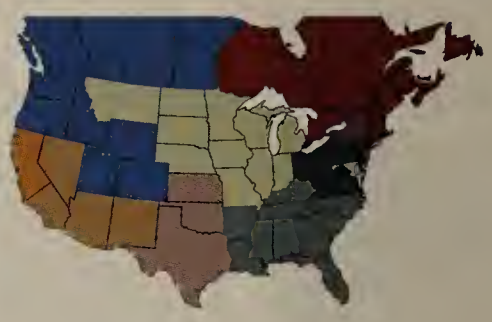

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**Novell,**
continued from page 8

Reaction to the move was generally positive.

"[Reorganization] may not be a cure for all their ills, but it certainly is a step in the right direction," says Phil Schacter, an analyst with The Burton Group, in Midvale, Utah. "Novell was obviously struggling with how to execute its new strategy. They had a customer base and a product focus they were losing track of."

> ***"Novell's got life; it's not going anywhere. . . . By separating the divisions, they still have their operating system to hold on to if one of the divisions flops."***
>
> Julian Smith, director, IS Thompson & Co.

Nicholas Tiliacos had been tapped to head sales but resigned just short of two weeks on the job, citing personal issues. Novell also named Dave Shirk as chief technical officer, a position that has gone empty for almost a year.

CEO Eric Schmidt blamed a disorganized sales channel for the company's revenue decline. "The majority of the problems were caused by ourselves," Schmidt said. He added that increased training would help improve channel sales.

Chief Financial Officer Dennis Raney said that reviving revenue would "not be a quick fix" and would not happen before the fourth quarter.

While channel sales were down, direct shipments of product to large enterprise networks increased, as did revenue from consulting services; Novell officials said ISPs and application service providers will require large amounts of consulting services to implement Novell products and services, they said, and the company will actively expand its consulting services.

One Novell customer remains confident that the company's fortunes can turn around.

"Novell's got life; it's not going anywhere," says Julian Smith, director of IS Thompson & Co., an advertising firm in Memphis, Tenn. "It's evident with Novell's [declining] stock price that it was time for a change. By separating the divisions, they still have their operating system to hold on to if one of the divisions flops," he says.

Novell has appointed the previous CEO and founder of JustOn, Simon Khalaf, as vice president and general manager of Net Content. Novell acquired JustOn in January and integrated its online data storage services into the company's service offerings. The three other divisions will be led by long-time Novell executives.

Although Drew Major, Novell's longtime chief architect, will spend the majority of his time with the Net Content business unit, he will also be involved in the Net Management and Net Directory groups. ◪

## Novell restructures

**Four business units, each responsible for its own profits and losses, will focus on the enterprise, dot-com and ISP/ASP markets.**

| Unit | Product |
|---|---|
| Net Management | NetWare<br>GroupWise<br>BorderManager<br>ZENworks |
| Net Content | OnDemand Services<br>NetPublisher<br>DigitalMe<br>NIMS |
| Net Directory | NDS Corporate Edition<br>DirXML<br>iChain<br>Schemax<br>Single Sign-On<br>eDirectory |
| Net Customer Service | Consulting services<br>Technical support<br>Education |

**Sun,**
continued from page 8

with the Sun Netra.

"If Sun does it right this time, their chances are great, because all those other boxes are installed in Solaris shops," Duplessie says. "Sun's appliance sounds cheap compared to Network Appliance and EMC."

The rack-mounted StorEdge N8000 file server takes about 10 minutes to install, according to Sun, and contains a browser-based management interface that lets system administrators add users to the NAS, configure the box, and manage and monitor its operation.

The N8000 has 10/100Base-T connections to the network and operates on Unix, Windows NT and 2000, or any network that uses the Network File System or Common Internet File System. The N8000 also uses a light version of Solaris, which means it can be managed by Sun management tools.

"We are a storage service provider that provides our services into collocation facilities," says Chris Reidler, vice president of engineering for Storageway in San Diego. "Our customers want a variety of file services that can scale from 50G bytes up to terabytes of storage. Because [Sun's] file servers are based on Solaris, I can participate in open clustering or management from a single console."

**The Sun StarEdge N8200 file server starts at $54,000.**

A mirrored boot-disk provides data protection by ensuring the system's storage won't be brought down by a boot-disk failure. In addition, Sun later this year will switch from 18G-byte drives to 36G-byte drives, which customers can install. The file system includes Sun Solstice and Veritas client software for network backup.

Sun will follow the N8000 with two other NAS appliances in July. The N8400 and 8600 will scale to 10 terabytes and have Gigabit Ethernet connections to the network. These products will also support Fibre Channel connections to storage-area networks in July.

The Sun StorEdge N8200 file server is available starting at $54,000 for a for a 200G-byte configuration.

Prices for the other products are not available at this time. ◪

**Tivoli,**
continued from page 10

ment and other tasks.

While generally happy with Tivoli, Nickelson says the company's services organization needs to reduce the time it takes to resolve problems.

Moreover, when the company rolls out new products, it must be careful not to sacrifice quality. Nickelson says she also would like to have greater user input on how Tivoli shapes its product direction.

### Storage Manager upgrades

At the conference, the company made its biggest thunder over Tivoli Storage Manager 4.1, which handles automatic high-speed data backup.

The product also has a so-called LAN-free management feature, which lets servers and storage devices move data through SAN pipes instead of over LAN channels. The company hopes this will help companies cope with the huge amounts of data generated by business-to-business traffic.

Also coming to Storage Manager is the ability to exploit EMC's TimeFinder, a software tool in the EMC Symmetrix storage server that takes snapshots of the data being stored. These snapshots are used to do high-speed backup of data for heavy-duty applications such as SAP's enterprise resource planning software. Tivoli also will provide a development tool kit to tie SAN management tools to NetView, the company's enterprise management application.

Tivoli Storage Manager 4.1 starts at $2,000 and will be available in July. It runs on Unix, Windows NT and 2000, and OS/390.

Tivoli also detailed improvements to its NetView mainframe-based product that will let users more effectively manage IP applications and Unix hosts.

Enhancements to Tivoli NetView for OS/390 1.3 will let IS staff gather Simple Network Management Protocol data off the mainframe's IP stack on items such as network interfaces and traffic statistics.

The NetView console will also be able to communicate with another mainframe in an all-IP network via tn3270 sessions. Additionally, NetView will handle automated management of distributed Unix hosts, Tivoli says.

Tivoli also announced that it will offer its software for rent through 2nd Wave, an application service provider that specializes in service to IT shops.

Tivoli already offers rented applications through the firm Triactive, but 2nd Wave will expand the number of products offered and will be more geared to larger enterprise networks, Tivoli says. ◪

## planetTivoli

### Planet Tivoli launch

**Tivoli detailed a number of new products and alliances at its customer conference last week. They include:**

- **Storage Manager Version 4.1 for automated high-speed backup of files and data.**
- **A tool kit to tie NetView into SAN management tools.**
- **Enhancements to NetView for OS/390 to let IS staff manage the IP stack on the mainframe via SNMP. Also coming is the ability for NetView operators to talk to OS/390 applications via IP.**
- **2nd Wave, an ASP, will offer Tivoli management applications.**
- **Compaq will resell Tivoli products.**

Java, continued from page 1

nents via the 'Net.

"We have a mature object-oriented language for components, and ways to develop them, distribute and integrate them," says Tracy Corbo, senior analyst with Hurwitz Group, a Framingham, Mass., technology consulting company. "And people want to develop this way: they either don't want — or don't have the resources — to write all their own code."

Getting software built faster, and saving time and money in development, are the main reasons for buying ready-to-use components. For these reasons, there has long been a strong market for Microsoft Visual Basic Controls, and more recently for ActiveX Controls and Component Object Model objects. The same is starting to happen with Java.

"When you want to build an e-business application, you can plug together Java components that someone else has written for an online shopping cart, a catalog, credit card authorization and for e-mailing receipts," says Sam Patterson, CEO of ComponentSource.com, an online component marketplace in Atlanta. "You've now built maybe 90% of your application and spent $10,000 to $15,000 on software components. That's not even one month of a developer's salary."

At ComponentSource, top-selling Java software includes InstallAnywhere for deploying Java programs, a set of JavaBeans for creating user interfaces called JFCSuite, and JClass Chart, which lets users create sophisticated graphs and charts.

In recent months, the marketplace sites have been adding an array of free and pay services for enterprise customers. Buyers can put out a "request for components," inviting registered developers to bid for custom software work. Testing services are being added and expanded, so the marketplace sites can certify parts of a component's operation and some level of compatibility with Java APIs and with each other.

ComponentSource has created an escrow service where it stores source code in case the component supplier goes out of business.

Rival site Flashline.com recently released Component Manager, a Java program that plugs in to the Web browser interface of any Java development tool set, such as Symantec's VisualCafe. It links users of a given tool, and their components, with an array of Web-based Java resources, including those on the Flashline Web site. Component Manager is free and downloadable from www.flashline.com.

The plug-in uses XML to let developers, from within VisualCafe, for example, view all components on local hard drives and search the full set of Java Development Kit documentation. They can also view Java code, usage examples, updated APIs, tutorials, forums and other online resources, all of which Flashline has packaged to be visible and accessible through the plug-in.

"We want to create an online service that changes the way software development is done," says Charles Stack, CEO of Flashline in Cleveland. "Originally it was a craft, like piecework. Over time it became an engineering discipline. Now we're wrapping complexity in a simplified interface on a component."

That approach is immensely appealing to corporate developers, ComponentSource's Patterson says. "Ninety percent of our customers are enterprise users, the Fortune 100 to 500 companies," he says.

Stack and Patterson cite almost unbelievable sales projections by market researchers. ComponentSource uses Ovum's projection of a $64 billion components market in 2002, although that includes tools and services. IDC, a market research firm in Framingham, Mass., forecasts nearly $2 billion in 2002 for a more narrowly defined software components market.

### Room for growth

Despite the forecasts, the Java components market is still in its infancy. "Java is just starting to grow in the open [components] market," Patterson says. "But the [collection of Java APIs, services and Java Virtual Machines] is stable, and good tools are widely available. And our sales are now doubling each month."

BEA Systems sells a Java application server and a set of e-commerce components through Flashline.

"We wanted maximum exposure to the developer community, and Flashline was focused on that same group," says Doug Wood, BEA's director of strategic alliances. "I can't tell you the absolute numbers we've sold through them, but we get over 400 [prospects] from them per week."

Wood credits Sun, Java's creator, with making this market possible.

"They defined the standard APIs for J2EE and said, 'No, you can't tinker with them and [try to] make them better,'" he says. "Gartner Group says the Java Virtual Machine will penetrate 90% of all desktops and servers by the end of this year. As a result of this standard, Java code today can be reused."

But "buyer beware" remains good advice. "We have bought components but only with the following criteria," says Rick Bullotta, chief technology officer with Lighthammer Software Development, a Java software company in Malvern, Pa. "One, we can obtain a source-code license with no strings attached. And two, there are no hidden deployment or license fees."

Component-testing services from marketplace sites are important new protections, but Bullotta says buyers still have to do their homework and be prepared to handle problems.

"The reality is that many times, the user becomes the first line of interoperability quality assurance because the supplier can't possibly have tested for every possible combination and interdependency," he says. "It's not a pretty sight when things don't work and the finger-pointing begins." ◪

## An avalanche of Java components

**A pair of Web sites are rapidly expanding their catalogs of ready-to-use Java software components. Industry observers say the J2EE specification is sparking a surge of development. Here's a sample of what's available:**

### From ComponentSource.com

- **HallamshireBeans for MQSeries 1.1,** $459:
  A set of JavaBeans, classes and interfaces that let Java programs access IBM's MQSeries messaging middleware.
- **Sirius Computer Consultants Tree Navigation Systems 1.3,** $23:
  A Java applet that creates a tree-style view of a company's Web pages.
- **Zero G Software InstallAnywhere 2.5,** $359:
  Automatically installs a Java Virtual Machine on a range of operating systems without the need to run a separate install program.

### From Flashline.com

- **Thought, Inc. CocoBase Lite Professional,** $29:
  Maps relational database tables to and from Java, now with support for the Together/J object modeling tool for JavaBeans and other features.
- **South Shore Machine Tools SexMachineBean,** $37:
  A program that uses the JDBC interface to access relational databases of names and addresses, format the data from all uppercase text to mixed-case text and generate a solution based on the gender of the first name.

www.nwfusion.com
CHOOSING COMPONENTS
Check catalogs from ComponentSource.com and Flashline.com to find the Java component that's right for you. If you can't find it, request it.
DocFinder find it 8335 online

**Microsoft,** continued from page 1

Justice, which has concluded Microsoft's products are already too intertwined.

Critics are skeptical that the company can pull off what has been called its Next Generation Windows Services (NGWS) strategy, which Microsoft will unveil formally and rename at an event on its Redmond campus scheduled for June 22.

The company is postponing the event because it feels a possible final ruling this week by the U.S. District Court in Washington, D.C. on the antitrust case "would distract attention and focus from our [NGWS] event. . . ."

"Microsoft loves spinning grand schemes, and this is another grand scheme," says James Kobielus, an analyst with The Burton Group in Midvale, Utah. "They will position everything they do now under this software-as-services banner."

In theory, companies would be able to integrate internal programs and data with services and information available on the Internet to create a rich interactive environment.

For example, a corporate accountant creating a forecast could automatically incorporate economic and country data provided by Web-based software services into internal programs and planning projections. E-commerce sites could benefit from reusable services, such as sales lead generators, for creating and customizing their Web sites.

In this model, Microsoft says the lines between Web sites and applications will blur, because some sites will actually be providing programming logic that can be called over the Internet by other applications. The applications themselves will be built from standard components that can be stored and used anywhere on the Web.

Although Microsoft has been tight-lipped about NGWS, sources say the company won't introduce any new products — just modifications and enhancements to existing software that will be delivered in the next two to three years.

The glue for the entire initiative will be XML, and Microsoft will re-engineer its servers, development tools and software to drive XML into the core of all its products. XML is a set of tags that provide data about data so disparate programs can exchange information.

A key focus for XML will be the servers that make up Windows DNA 2000, a platform for building Web-based applications. The servers include Windows 2000, SQL

See **Microsoft**, page 84

On The Networked World live webcast,
what separates
a respectful debate on the Microsoft® breakup
from a lively exchange
approaching

# chaos?

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# Backspin

# Customized . . . in The My Decade

*"Burger King and Independence Day have a lot in common, we both adhere to the 'Have It Your Way' principle. This nation's founding fathers set the tone a long time ago by having it their way, and we've followed their lead. Burger King has been customizing burgers since being established in 1954, and we plan to pass that core equity message on to a new generation."*

**— Rob Calderin, vice president, USA Marketing, Burger King press release, July 1, 1998**

MARK GIBBS

When Tom Wolfe coincd the term "The Me Decade" in *New York Magazine* in 1976, he hit on a key attribute of the '70s — the sense of selfishness that defined the time.

Then we endured The Ugly '80s, which featured global political upheaval at center stage accompanied by rapacious capitalism.

The next decade was decidedly different: The Networked '90s got everyone focused on being digitally connected and turned the word "Internet" into an everyday term.

Now I don't know what the final two decades of the 20th century should really be named, but I think that the first decade of the new millennium will come to be called The My Decade.

Just think — what is it that has come to characterize the expectations of consumers in the Aughts? (I settled on the term "Aughts" because the "Zeroes" doesn't sound right and the "Ohs" sounds wimpy.) The answer is personalization — "make it mine" (which from the vendor's side is "make it yours").

Over the past few years, consumers have been trained to expect that the world will be focused on their needs, wants and desires. It starts with hamburgers ("Have it your way") and progresses through news ("News your way") to travel ("Costa Rica your way") and books on gambling ("Gambling odds your way").

And then there's the Internet. "My Yahoo," "My Excite," "MyWay," "INKE.com — Shop Your Way!," "EZCD — Music your way" . . . the online "my" and "your" lists are endless. And guess what, for many people, this simplistic pitch of promised personalization works — they feel they are getting superior attention.

Many Internet users now expect that wherever they go on the 'Net, they will find content and services that can be tailored to their needs and wants. Whether it be a general portal or the front end to buying cars, a "my-ified" customer interface is de rigueur if you want to be a serious online player.

Never mind that many of the "my" services are a sham that let the company behind the site get more personal details out of you in exchange for putting up a banner saying "Welcome Joe Smith."

But in some cases, the personalization is real. "My CDNOW" for example really does improve your shopping experience (curiously, Amazon.com, which got into personalization ages ago, has never added a "my" to the label).

So where The Me Decade was self-absorbed and narcissistic, The My Decade is about an expectation of quality service and distaste for being part of the hoi polloi (no matter if the solution is fiction). Of course, many of the online companies that promise personalized service will pay the price.

The "My shams" and "Your underachievers" that provide poor or false personalization will become increasingly visible as standards rise and consumers develop more concrete expectations — consumers won't settle for something that just looks like personalization but has no real benefit. If you offer the ability to personalize your Web site, think carefully about whether you are ready for The My Decade.

That is, unless you're in the burger business. We've already reached the peak of burger personalization.

*Send your way to my way: nwcolumn@gibbs.com.*

# 'NET BUZZ

The latest on the Internet/intranet industry

PAUL MCNAMARA

**Find chaos in corporate America —** preferably expensive chaos — and chances are good you'll be staring at a business opportunity.

**SkillsVillage.com CEO Chris Wong** says he found chaos when he began talking to large companies about recruitment and cost-accountability procedures for hiring temporary contract workers. Big companies annually spend tens of millions of dollars on hundreds of such workers, Wong says, but many admit having only a vague idea of where that loot goes or what it buys.

"When we talk to customers we always ask them how many independent contractors they purchase on an annual basis," Wong says. "One of our customers said anywhere from 50 to 5,000."

That doesn't mean it varies. It means they don't know.

"It's frightening, absolutely frightening," Wong says.

Unless, of course, you're launching a business that's designed to bring order to this chaos. According to Wong, SkillsVillage slides a layer of sophisticated software and services between a customer's hiring managers and the gnarly jumble of staffing suppliers who drag contractors to the doorsteps of employers. SkillsVillage saves money on the customer's side of that equation by, for example, preventing managers from directing work toward friends and family. They attack the supply side by weeding out agencies that add nothing to the process but a steep fee.

SkillsVillage claims it can save 25% or more on these expensive hires.

The start-up has $20 million in venture capital from various backers, including **Technology Partners, SageBrook** and **Marc Andreessen,** he of **Netscape** and more recently **LoudCloud** fame.

**Napster may be the hottest thing** to hit the Internet since that Pamela Anderson Lee video, but the MP3 music site can't possibly be as popular as a number of recent press accounts might indicate.

One story uncritically reported Napster's claim that its membership base of 10 million users increases by 5% to 25% every day. There was even a parenthetical (daily!) added for emphasis. A second story pegged the growth rate at up to 10% a day. (Daily! . . . That was my emphasis.)

Well, Napster could claim to have a newly recorded duet by **Elvis** and **Janis Joplin,** but that wouldn't make it a bona fide fact.

A 10% daily growth rate on top of a 10 million-member base would mean in about a month all 275 million men, women and children in America would be registered and downloading music through Napster. This would include, of course, all the musicians, recording company executives and lawyers who have sued Napster for copyright infringement, as well as all of you network managers who are busy blocking user access to this colossal waste of bandwidth.

The Internet would be nothing but a big honkin' stereo system.

**How many times** have you found yourself asking this question: "Wouldn't life be grand if we could actually watch and hear this Buzz fellow deliver his opinions, instead of simply reading his words on static newsprint?" . . . Well consider June 2 your lucky day.

**"The Networked World"** — a joint venture of this publication and ITWorld.com — will present its second monthly Webcast on Friday at 1 p.m. EDT. In addition to a few minutes of ranting from yours truly, the show will feature commentary from the shady Mr. Gibbs over there on the left side of this page. And here's the main course: **Network World Editorial Director John Gallant** will lead a roundtable rumble about the fate of **Microsoft,** while **Executive Editor Doug Barney** will deliver the kind of current events that have made his NetFlash newsletter more popular than **Napster.**

All that fun and we don't change a nickel. See details and signup information at www.itworld.com.

*C'mon, you know you want to complain about something. The address is buzz@nww.com.*

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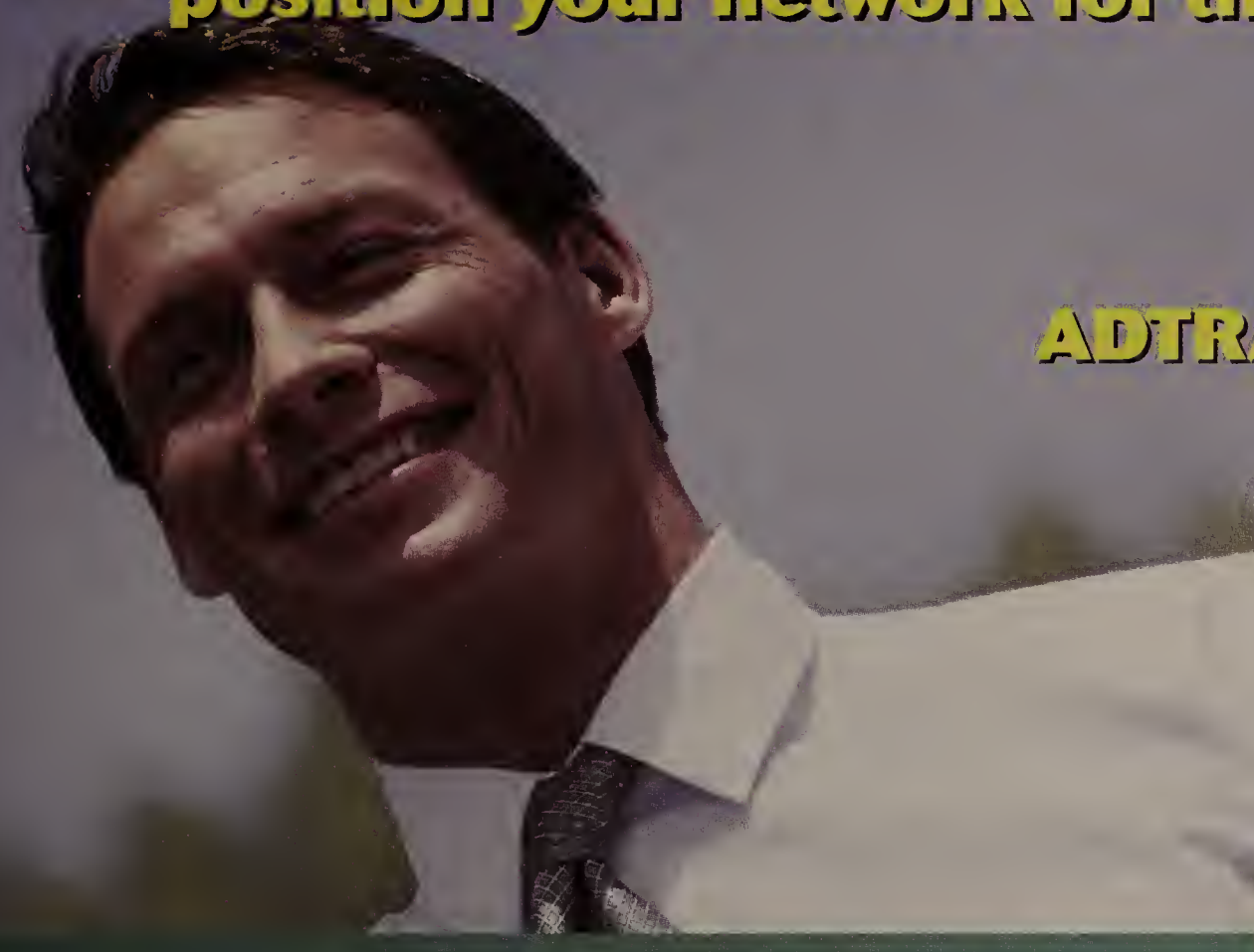

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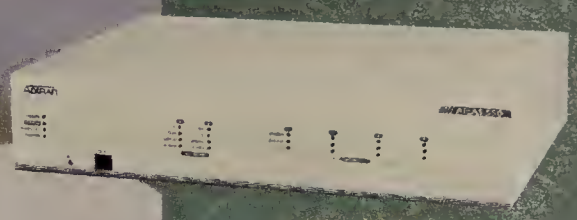

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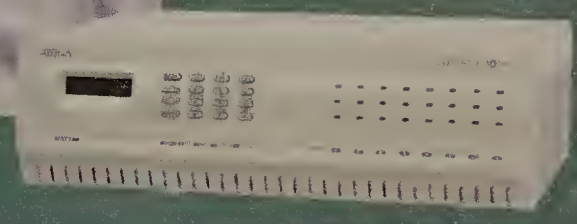

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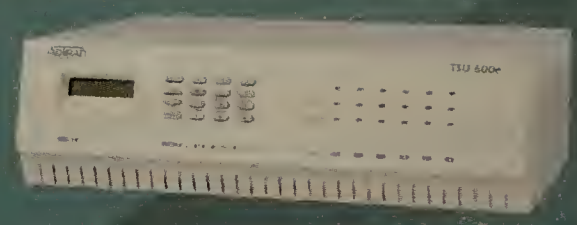

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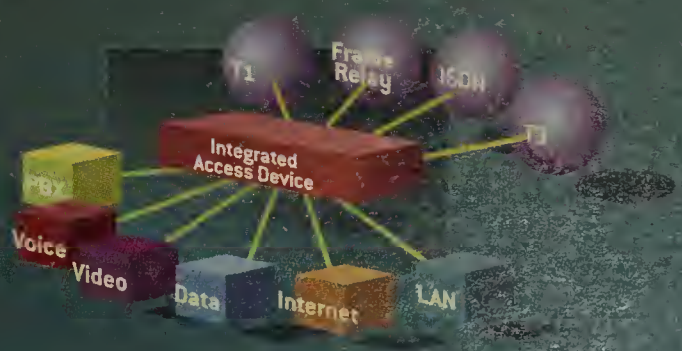


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